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The International Journal of Orthodontia and Oral Surgery

A Monthly Journal Devoted to the Advancement of the Sciences of Orthodontia, Oral Surgery, and Dental and Oral Radiography

Martin Dewey, D.D.S., M.D., New York
Editor-in-Chief

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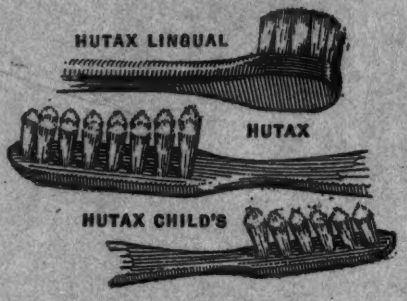

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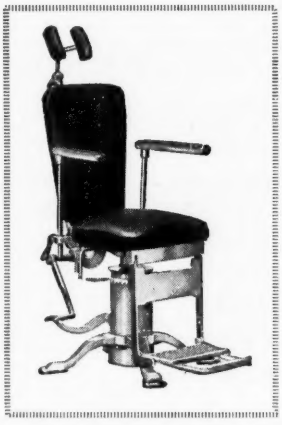

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VOL. VII ST. LOUIS, JUNE, 1921 NO. 6

ORIGINAL ARTICLES

A FEW CONSIDERATIONS FROM THE ORTHODONTIC STANDPOINT*

BY W. W. WOODBURY, B.SC., D.D.S., HALIFAX, N. S.

SIR WILLIAM OSLER, a short time before his death, in his inaugural address as President of the British Classical Association, spoke as follows:—"The extraordinary development of modern science may be her undoing. Specialism, now a necessity, has fragmented the specialties themselves in a way that makes the outlook hazardous. The workers lose all sense of proportion in a maze of minutiæ. Everywhere men are in small coteries intensely absorbed in subjects of deep interest but of limited scope."

Now I think that is the position in which we dentists are in great danger of finding ourselves—or worse yet, not finding ourselves,—not realizing we are in that position! We as a profession have forgotten the rest of the body and have "become intensely absorbed in a subject of deep interest but of limited scope," and that subject is largely the mechanical restoration of lost tooth-tissue. In recent years, the more general considerations of bodily well-being and the dental factors relating thereto have been forced on our attention by men both within and outside of our own ranks, as they have worked away at the problems of infection, focal and otherwise, nutrition with all that it implies, and growth and development in general.

Sir William's remarks, apropos of specialization, might be supposed to be peculiarly applicable to one who essays to further subdivide, and confines his attention to one branch of dentistry; which in turn, we often refer to as being in fact, if not in practice, a division of medicine. But I wish to submit that orthodontia, if properly comprehended, is not narrowing, but furnishes the means for a most broadening survey of all the activities of dental science. Dr. LeRoy Johnson, of Boston, said to the writer recently in effect as follows:—"I do not know of any subject in the dental curriculum that provides the teacher with

*Read before the Nova Scotia Dental Association, Sept. 17, 1920.

such an opportunity for correlating the various subjects of the course." And having arrived at this point, and as a reminder that our idea is not so very new after all, I cannot refrain from a further quotation from Osler, in which this time he quotes Plato, who in insisting on the essential unity of all knowledge says as follows:—"Now when all these studies reach the point of intercommunion and connection with one another and come to be considered in their mutual affinities, then, I think, and not till then, will the pursuit of them have a value."

Johnson has defined orthodontia as "That branch of dentistry which treats of the forces controlling the form of the dental arch." Those forces are by no means understood as yet in their entirety, although some of them are quite obvious. But the important thing that I would wish to stress, is that of "forces in control"; not only forces that have controlled in the development of the arch, but forces actually in control every minute,—all the time. When once that idea is grasped, it is seen that the dental arch is not a fixed thing. Conklin, in his recent book "Heredity and Environment" says, "Living cells and organisms are not static structures that are fixed and stable in character, but they are systems that are undergoing continual change. They are like the river, or the whirlpool, or the flame, which are never at two consecutive moments composed of the same particles, but which nevertheless, maintain a constant general appearance; in short, they are complex systems in dynamic equilibrium." Those last two words to my mind, express the condition obtaining within the dental arch;—dynamic equilibrium.

Now any one who constantly has in mind this conception of dynamic equilibrium will be careful to do nothing that will tend to disturb or upset that condition. When tooth restorations are necessary, he will be careful to perform the operation, whatever the material employed, so that Nature's tooth form may be reproduced, to the end that proximal contact may be preserved, and the inclined planes of the cusps may function as was intended, and the pericemental attachment be shielded from injury. In doing this he will be definitely conserving three of the forces that enter into this dynamic equilibrium; for the preservation of proper *form* of proximal contact will insure that the *force* of proximal contact shall operate normally instead of abnormally; for operate it will. And the correct reproduction of cusp form will insure the normal functioning of the force of occlusion, which is one of the very important factors in the maintenance of arch form. And anyone who has so formed his restoration as to successfully provide for correct proximal contact and the correct inclined plane will, in all probability, have also attended to that other detail more frequently overlooked, and that is the proper sloping of that portion of the occlusal surface immediately adjacent to the point of proximal contact, so that under stress of mastication the food, with the exception of a negligible minimum, may be slid away from the interproximal space, rather than definitely and unavoidably into it, as is so often the case. In avoiding this latter condition he will be again conserving a factor in maintenance of arch form, and that is normal cell metabolism; the cell metabolism more especially of that tissue that normally fills the interproximal space. The other

side of this picture is of course, food packed into this space, with consequent inflammation and laceration, progressing rapidly toward resorption, and the probability of a well established pericemental infection.

And so another and very important result of this conception of the arch as a living thing, an assemblage of units, each one of which is not only accurately placed in relation to its fellows, but the whole acutely responsive to forces constantly at work, will be that one's minutest operation will always be done with a mental picture of its effect upon the whole, as a background, and it will be found that that whole will constantly enlarge, and the imagination will take in not only the dental arch but the entire organism.

If the loss of some part of a tooth is going to enlist the care outlined above in its restoration, we are surely going to look with dismay on the entire loss of the tooth. And right here, I wish that we might confine our attention to the deciduous teeth and the permanent teeth of children and young adults.

Added to the idea of dynamic equilibrium, which may quite accurately describe the condition of the established dental arch, we have in early life another influence present—that of growth. In considering this fact of growth, we can be a little more analytical than Topsy, who was quite sure that she "just growed." We can see that growth is stimulated by some things and inhibited by others. And one of the factors of prime importance in normal growth is mechanical stimulus, or perhaps better, dynamic stimulus—the suitable application of force. So great a factor is this in the growth of bone that one eminent anatomist has defined bone as "calcified lines of force." In the case of the jaws this force is applied at least in two ways: first, through muscular attachment, and second through the functioning of the teeth. This does not exhaust dynamic stimulus, but probably accounts for most of it.

If all the teeth are present in early life and free from disease so that function is normal and pleasant, the dynamic stimulus, other things being equal, will be a powerful aid in the direction of symmetrical and vigorous growth. If teeth are diseased so that mastication is avoided because of the pain involved, with a consequent let up of muscular action, just so far will normal growth be prejudiced, to say nothing of the attendant damages of infection. And if teeth are actually lost, our condition of dynamic equilibrium is not only going to be sadly disrupted, but, the chances for symmetrical development are going to be greatly impaired. And we know that this applies to the deciduous teeth as well as to the permanent ones. There is no need for laboring this point, the truth of which we would all willingly subscribe to; and the writer is not so long removed from general dental practice that he is not fully aware that it is much easier to stand up and preach absolute conservation of all teeth than it is to actually carry it out, when it comes to office routine. Yet it surely does no harm to contemplate this ideal frequently.

Our next logical step would carry us further afield than the confines of this brief paper and would point to the consideration of prophylactic care

of the mouth and the enlightenment of the people in these important matters: preventive dentistry and popular dental education.

A well-known magazine writer recently said: "Form the habit of devoting a few minutes every day to thinking about your work in a large, broad, imaginative way. Try to see it for what it assuredly is—a vital necessity to yourself and a useful service to society." I would like to suggest in closing that if one gains the conception outlined above of the essential unity of all our apparently separate and often minute operations, there will be no need for the setting aside, artificially, by an act of will, the aforesaid "few minutes", but this will just naturally be the atmosphere in which we will work all the time.

SIMPLIFYING MODEL TRIMMING*

By Bernhard Wolf Weinberger, D.D.S., New York City

DURING the past few years a number of machines have been devised purely for model trimming in orthodontia, at the same time photo trimmers and other appliances have been made use of or modified to accomplish the above purpose.

It is my intention to present a means, which is simple, positive, and easy

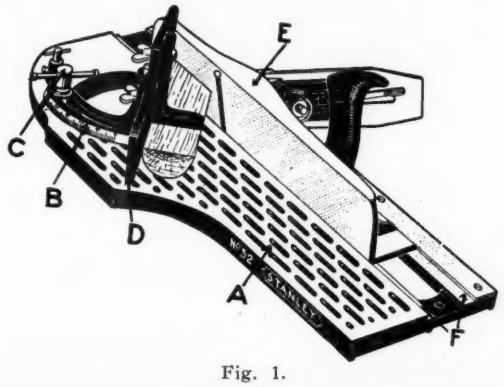


Fig. 1.

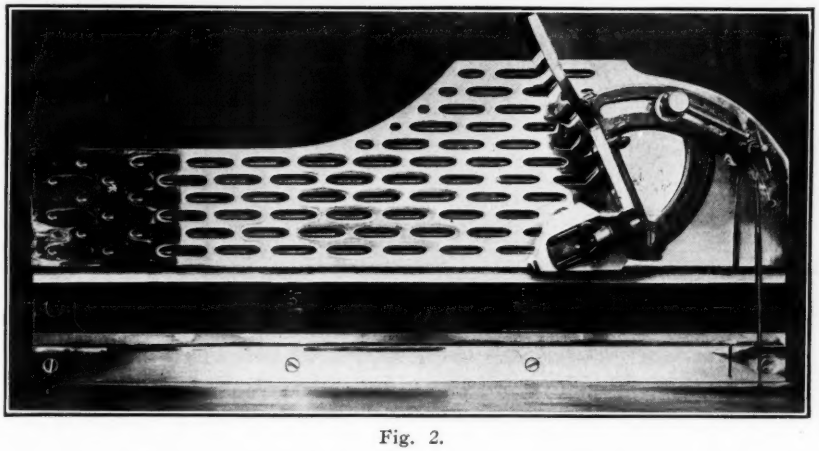


Fig. 2.

to manipulate, an instrument which I have used for over two years with perfect satisfaction.

Although I have not seen it mentioned or demonstrated heretofore, it would not surprise me to learn of others who have used this same plane. At any rate it has been such a time saver in my own practice, that I feel it my duty to present it as well as a few other devices for your consideration.

*Clinics given before the American Society of Orthodontists, Chicago, April 3-7, 1920, and the Eastern Association of Graduates of the Angle School of Orthodontia, New York, April, 1920.

Before describing it, permit me to state that these devices can be purchased at any hardware or department store and need no modification, except that the plane I have in use was heavily nickel plated, first receiving a copper coating, and then the nickel, otherwise there has been no change.

Fig. 1 is a cut taken from the catalogue of the Stanley Rule and Level Co., (New Britain, Conn.) and is known as the "Stanley Shoot Board and Plane," No. 52. It is a combination of plane and shoot board. The board, *A*, is made of special iron, is of ribbed construction, and has an adjustable runway, accurately machined for the plane.

The swivel *B*, is indexed at forty-five and ninety degrees for planing a

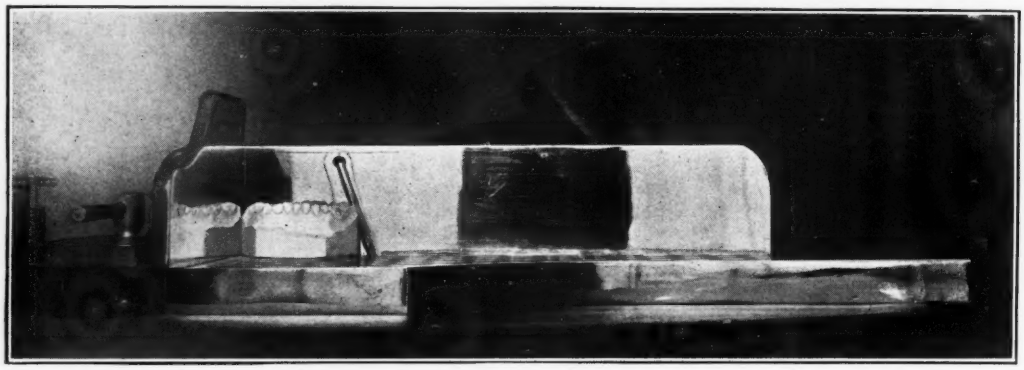


Fig. 3.

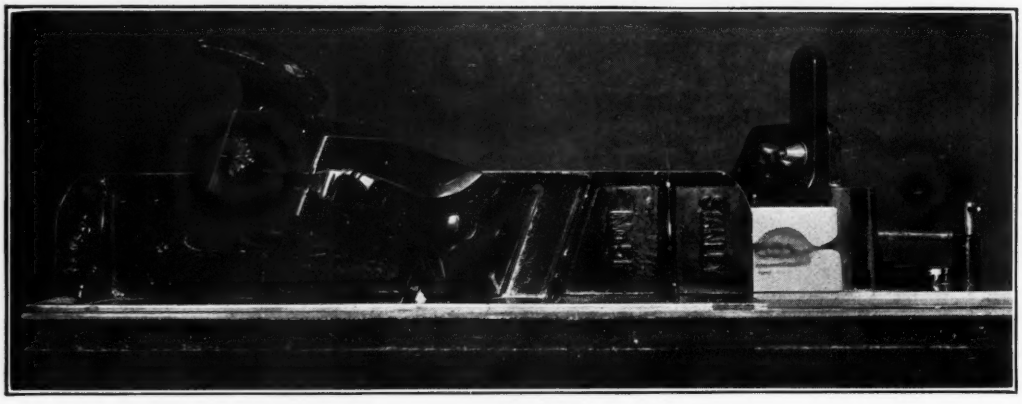


Fig. 4.

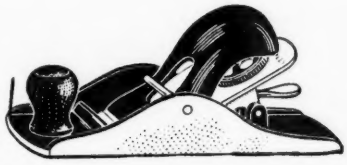
mitre or square, but can be securely locked by means of a clamping screw (*C*) at any angle desired, between zero and a hundred and eighty degrees, the quadrant being graduated between zero and ninety degrees. The swivel is also fitted with a sliding back (*D*) that can be adjusted close to the plane, thus supporting the work. This back is at right angles to the base.

The plane (*E*) fits in the runway (*F*) and is also at right angles to the base. It is sufficiently high to take in almost all cases, the top and bottom. Instead of the blade being placed at right angles to the side, in this plane it sets at such an angle that the top strikes the model first and as the plane slides forward, it gradually cuts the plaster.

Fig. 2 shows the base with the model in place and the swivel adjusted to the side of the model.

Fig. 3 the front of the shoot board with the plane at the back of model, and the model in place. One can readily see the advantage of the blade being set at the angle as illustrated.

Fig. 4 illustrates the front of the plane and shows the model at right angle to the base, to the plane and the swivel. All one needs to do is to follow the line drawn on the model and time does not need to be consumed in constantly testing the angle, for we know if the model is held securely, it must be at right angles to the plane.



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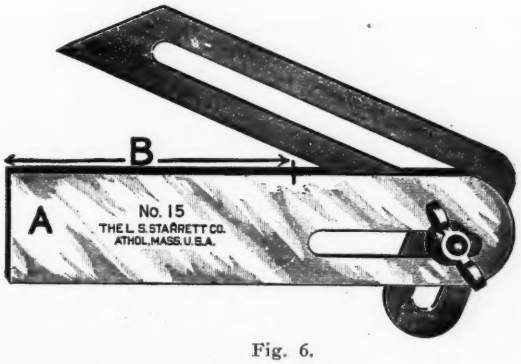

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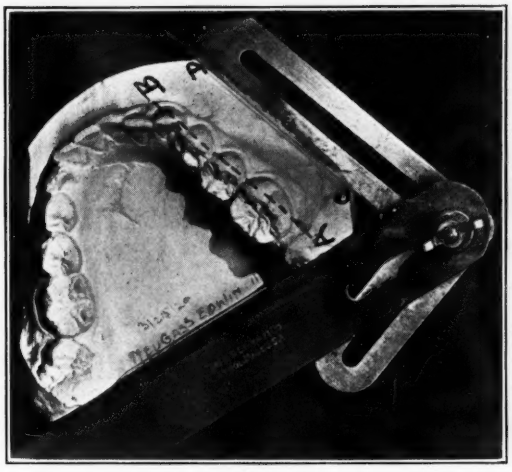


Fig. 7.

Fig. 7.—Universal bevel applied to the model. Unfortunately the one-sixteenth in steel, soldered to the part applied to back of the model, appears as a mere line. This piece one and one-half inches high and three inches long is soldered at the center, so that three-quarters of an inch appears above and below the bevel to prevent tipping.

In trimming the models the first step is to determine the base and draw a line around the plaster. Then trim with the smaller plane as shown in Fig. 5. After the base has been secured the upper and lower models are planed in occlusion and a small mark is placed sufficiently back of the molars on one side. With a compass a corresponding mark is then placed on the other side of the lower and then the back is trimmed.

To obtain the sides, a small Universal Bevel No. 15 as shown in Fig. 6 is

used. Have found it practical to solder at a right angle to the part marked *A*, a piece of 1/16 inch thick steel, and an inch and a half high. This gives a steady base. I then place this against the back and adjust the other end over the buccal cusps of the teeth as shown in Fig. 7, *A-B*. Then tighten the set screw. Afterwards it is only necessary to draw on the upper part of the model the line *E-D*. Place this line directly over the runway and adjust the swivel. Repeat this for the other side by adjusting the bevel first to correspond with the buccal side of the teeth. A great many men prefer to make all the sides of corresponding angles with the back. I personally feel that this is wrong, for our models in the beginning should show us the unsymmetrical development of the arch, and if the sides are trimmed to the buccal surfaces of the teeth, this angle should vary and should give our first idea of treat-

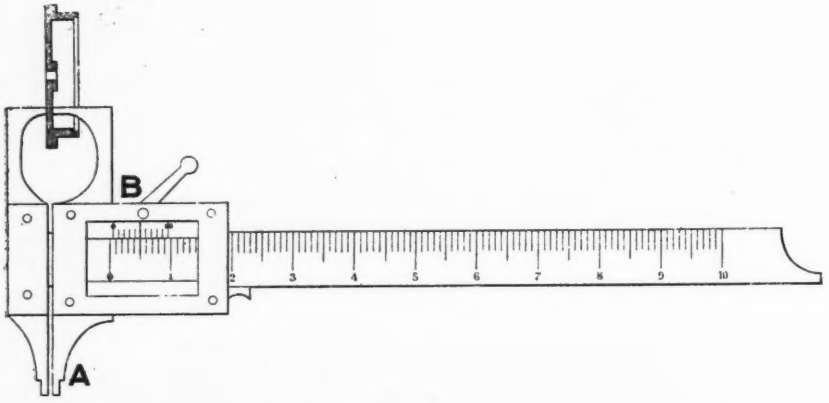


Fig. 8.

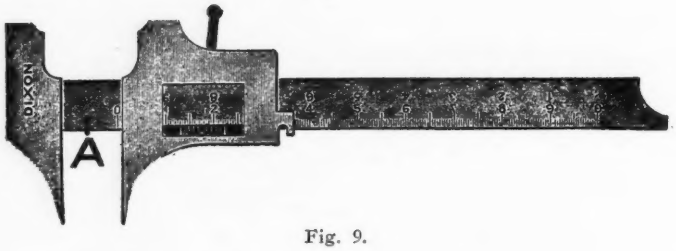


Fig. 9.

ment. After the sides have been obtained, the line in front is drawn with a compass and cut with a knife to about this mark. The model is placed once more on the shoot board and the plane held firmly on it. With the left hand the model is rotated slowly against the blade, giving a fine even surface, at the same time being trimmed at right angles to the base. This is one of the advantages of using the plane.

The sharp angles at the base and sides can be secured by means of the Boley Gauge, Fig. 8. This gauge has also been modified by removing the top part at *B*, and tapering the points at *A*, until it resembles Fig. 9. Setting this gauge at 5 mm. for the smaller models or 7 mm. for the larger ones, adjust one point on the back and turn the gauge until the point of the angle is opposite *A*, in Fig. 9, the other edge will then touch the side. This adjustment can readily be obtained after a while with the eye and then draw both lines at the same time, trim to these lines.

The top is easy to obtain in the following manner, first determine the height, this being one-third greater than the anatomic portion and describe a mark. Then place a flat piece of metal on the base of the lower model. For this I use the Stanley No. 0 Steel Scraper 3″ x 4″, Fig. 10, which can also be used to start the top and bottom by scraping to the mark, before planing. With the models in occlusion, adjust the Boley gauge from the steel base to the mark on the upper, describe a line around the upper, sliding the gauge over the steel scraper. We are then positive that the upper is parallel with the lower. By first using the small plane and then the larger, in no time

Fig. 10.

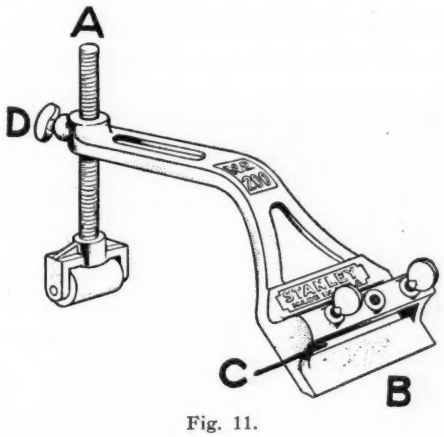


Fig. 11.

our models have been completed, with smooth even surfaces all at positive right angles. Since using this method the time consumed in trimming models has been reduced over one-third.

Fig. 11 is another useful device that can be secured from any hardware dealer and is used for sharpening the blades of the planes. The blade is placed in this insert at *C*, while *B* rests slightly above the carborundum stone. This angle can always be made the same by adjusting the roller part *A*, to the required height, the thumb screw, *D*, holding it firmly.

HEREDITY AND VARIATION ETHNOLOGICALLY CONSIDERED*

By Calvin S. Case, M.D., D.D.S., Chicago, Illinois

IF THE parents come through long lines of normal symmetrical forms of proportionate size in relation to each other, the offspring will follow the normal type,—barring natural variation and atavistic heredity from distant inharmonious progenitors. If one of the parents is characterized by some definite disharmony of features, as a marked disproportion in the size of the nose, the ears, the jaws, the teeth, etc., there may arise in the offspring any one of a number of definite forms of products, or their blending gradations; the dominant and recessive types being largely dependent upon the strength or persistence of parental strains.

It is not a rare occurrence, as stated in the previous chapter, to find in one such family a child having features which show a blending diminution of disharmonizing characteristics; another will show a predominance of the type of one parent or the other; and in another will be seen the disharmonizing features of one parent in immediate association with features which are distinctly that of the other, etc. Thus, every variety of change and interchange of *inheritable* features and characteristics—or those which have not arisen in the individual from extrinsic causes or environment—possessed by parents, may arise in the offspring from direct inheritance.

Again, a child of fairly symmetrically formed parents will have some one part of the face quite out of proportion in size, form, or relative position to the otherwise harmonious features, but one which has been a characteristic feature of a grandparent or great grandparent, or known to have had existence in some more distant progenitor. Moreover, the laws of heredity present a variety of possibilities which can neither be regarded as direct, nor as atavistic heredity *per se*.

Mothers who have brought their children to orthodontists have frequently said: "I don't see where the child got those prominent protruding teeth, neither his father nor I have teeth like that, and so far as we can learn no member of either of our families for generations back ever had such teeth." This does not refer to the many similar expressions from the lips of loving mothers upon the eruption of the first permanent incisors, which are always far out of proportionate size with the "baby" teeth and childhood features, and thus erroneously regarded as abnormal; but as the case in question may

*This article is revised from the fourth of five chapters of Part II entitled "Etiology of Malocclusion" in the forthcoming revision of "Dental Orthopedia" by Calvin S. Case. The first chapter entitled "Etiologic Principles of Malocclusion with Reference to Treatment," was published in the September, 1920, number of Dental Items of Interest. The second and third chapters entitled "Etiologic Influences of Deciduous and Erupting Permanent Teeth with Principles of Treatment," and "Laws of Biology Regarded as Etiologic Factors in Malocclusion," were published, respectively, in the March and April issues of this journal. The last chapter which we hope to publish in the June number is entitled "Practical Application of Biological Laws."

be one of the dento-facial protrusions, let us suppose by way of examining biologic possibilities from a scientific standpoint, that it is one of those extreme cases of bimaxillary protrusion in which the entire dentures of both jaws are protruded in relation to the mandible and other bones of the skull; this deformity being always enhanced by a "receding chin effect." (See Fig. 1.)

We shall take for granted it is true that no one in either of the two immediate families referred to above, ever had a similar condition of the teeth, and that the said patient is a child of legitimate birth. If this condition of pronounced bimaxillary protrusion were one of very great rarity, seen perhaps only once in a lifetime, it would be called a "freak" by many. Others who are firm in their belief of atavism, even through many generations of progenitors, would see in it a recurrence of some former type. But as this partic-

Fig. 1.—The above shows the common facial type of bimaxillary protrusion.

ular form of malocclusion, in different degrees of its prominence, happens to be one of somewhat common occurrence, seen plentifully in large cities of nations composed of mixed races, there is every reason to believe that this and other irregularities of the teeth and jaws have at times arisen through the activities of "Mendel's Law" in biologic generation, *which precludes the usual hereditary necessity that some one of the forebears must have been characterized by a similar general disharmony of the features.* Modern biologic investigations in crossbreeding have abundantly proved that combinations of the most complex nature may be brought about through the activities of this law, with results which are at times highly beneficial in the offspring, and again with results which are exceedingly abnormal in appearance, and so deficient in

adaptive variations, that—under the law of natural selection—they soon become extinct.

MENDEL'S LAW

In the short space of this chapter it will be impossible to give more than a glance at recent investigations along this line. The student is referred to any one of the modern works upon biology for a fuller description. The following excerpt from a recently published textbook entitled "Biology," by Stackpole, teacher of Biology in Columbia University, will give a brief summary of this phase of heredity: "Much attention has in recent years been given to the experimental study of variation and heredity. These experiments are of interest in connection with Mendel's law, a law so important in the science of biology that Professor Bateson has written of it: 'The experiments which led to this advance in knowledge are worthy to rank with those that laid the foundation of the atomic laws of chemistry.' The discoverer of the law was Gregor Johann Mendel (1822-1884) an Augustinian monk. * * * To gain an idea of the scope of these principles, one cannot do better than turn to Mendel's own account of his experiments. Punnett's 'Mendelism' and Thomson's 'Heredity' give such an account:

" 'The new science of heredity has much to teach the practical man' says Punnett. 'Let us suppose that he has two varieties, each possessing a desirable character, and that he wishes to combine these characters in a third form. He must not be disappointed if he makes his cross and finds that none of the hybrids approach the ideal which he has set before himself; for if he raises a further generation he will obtain the thing which he desires. He may, for example, possess tall green-seeded and dwarf yellow-seeded peas, and may wish to raise a strain of green dwarfs. He makes his cross—and nothing but tall yellows result. At first sight he would appear to be further than ever from his end, for the hybrids differ more from the plant at which he is aiming than did either of the original parents. Nevertheless, if he sow the seeds of these hybrids, he may look forward with confidence to the appearance of the dwarf green (in proportion of 1 to 3 of the dominant tall yellows) and owing to the recessive nature of both greenness and dwarfness, he can be certain that for further generations the dwarf greens thus produced will come true to type.' "

Experiments with mice and many of the lower animals have so repeatedly confirmed these results in all instances where the conditions and requirements are fulfilled, that the principle is now recognized as one of the established laws of heredity. One who is skilled in crossbreeding can produce in the offspring any combination of characters or strains which are well established by heredity in the parent stock. Not only that, but he can cause to be completely dropped from the combination in the offspring and subsequent generations of the type, strongly marked characters of the parent stock. For examples, look at the work that Burbank is doing today.

Now let us apply this law to our patient whose protruding teeth seem to have arisen from no cause. Both parents may have passed down from long lines of typically formed progenitors, both families of which were fairly symmetrical in physical forms, according to racial type, and yet when the two lines are compared with each other, they are genetically quite disproportion-

ate in size, physique, and character of features; the one characterized by large strong bones, muscles, and sinews, as occurs with dominant types in certain tribal races, while the other family is built on a more delicate effeminate plan, and yet with this strain of its characteristic type none the less persistent.

When one considers the endless variety of unions which arise in mixed races, it must be realized that it is no far-fetched proposition that marriages have and do take place between dissimilar types who possess all the exacting requirements which place them under the rule of Mendel's law, and with the strong probability that the first offspring of these unions are characterized by the dominant type,—as in the production of the "tall yellow" peas. Let

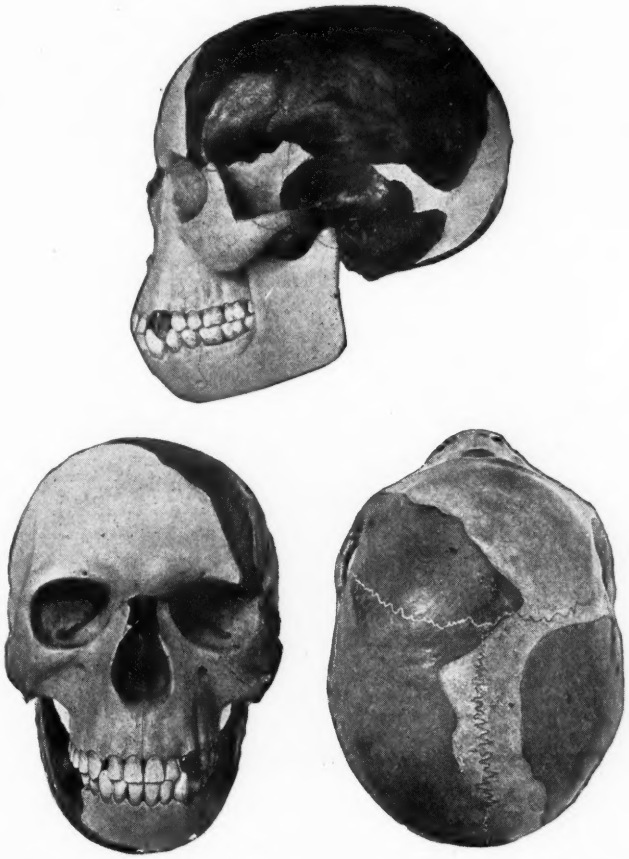


Fig. 2.—Three views of the Piltdown skull as reconstructed by J. H. McGregor, 1915. This restoration includes the nasal bones and canine tooth, which were not known at the time of Smith Woodward's reconstruction of 1913. One-quarter life size. Copyright, 1915, 1918, by Charles Scribner's sons. "From 'Men of the Old Stone Age,' by Henry Fairfield Osborn; by permission of the publishers."

us suppose that this pertains to the large heavy bones and teeth of the stronger parent. If this character of offspring should meet and marry other similar offspring that have arisen in the same way (which is more than possible) in the second generation there will be a strong hereditary tendency for a recessive type to arise, or parts of the recessive in combination with the dominant. This means that undiluted physical characters, parts or properties of the delicately constructed grandparents upon one side, will arise in combination with the strongly marked physical characteristics of the other grandparents, both of

whom composed the original characters of these distinctively dissimilar types. It is not more than possible that this typal mixture may express itself through the laws of heredity by a disproportionately large mandible or maxilla or both as compared to the other bones of the skull of the individual, or may it not be the large strong teeth of the dominant type in combination with the smaller and more delicate jaws of the other as in cases which Dr. Cryer has mentioned? The large teeth striving to force themselves into the small jaws are with their alveolar processes naturally carried forward rather than backward, because of the obstructing rami and tuberosities, with the production of any one of the decided dento-facial protrusions; and through the same biologic processes that have produced other imperfections in facial outlines by an asso-

Fig. 3.—The Piltdown man of Sussex, England. Antiquity variously estimated at 100,000 to 300,000 years. The ape-like structure of the jaw does not prevent the expression of a considerable degree of intelligence in the face. After the reconstruction modeled by J. H. McGregor. "From 'Men of the Old Stone Age,' by Henry Fairfield Osborn; copyright, 1915, 1918, by Charles Scribner's Sons. By permission of the publishers."

ciation of immediate parts of physiognomies that are inharmonious in size or relation.

Through careful artificial selection in the processes of hybridizing, excessive protruding mandibles and teeth of bulldogs have been produced, together with equally marked physical variations in domesticated animals, fruits, flowers, etc., and too through methods of crossbreeding not unlike those which possibly may, and very probably do, obtain in the multitudinous variety of natural unions of dissimilar types in the human race, which so often result in disharmonious combinations in the facial outlines of individuals.

The short upper jaws and prognathic mandibles of pug and bull dogs arose

originally either from a natural variation or from cross fertilization. This has been increased to the present types largely by selective breeding or hybridization. For bench show purposes this biologically developed abnormality is still further enhanced artificially in the individual by mechanical devices which inhibit the growth development of the maxilla, and through the same channels of forces that obstructive diseases produce pathologic inhibitions. Physical changes in the individual, wrought in this way from intrauterine, postnatal, or any of the extrinsic local causes, however, are never transmitted to offspring, it being one of the accepted laws of biology that all inheritable characteristics invariably receive their propagating qualities during the metabolism of the germ cells.

It has been erroneously asserted that "nature does not place in one organ two or more parts that are disharmonious in their sizes," also that "it is impossible for two component parts of any section derived from the same embryonic bud of development to be in disharmony with the whole." This is abundantly disproved by the many disharmonies in closely related parts repeatedly exemplified everywhere by heredity alone. Moreover, it is one of

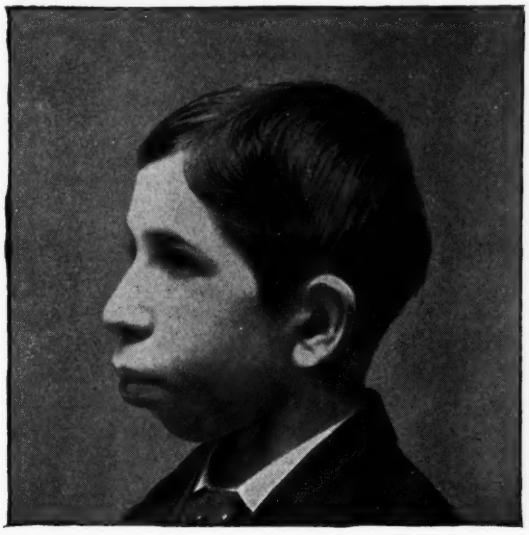


Fig. 4.—From a photograph of a lad suffering from hypertrophy of the gums and alveolar process. (Cryer.)

the most constant and expected products of hybridizing. Were it not for this, we would not today be enjoying the great variety of fruits and flowers of our times.

In regard to this phase of the subject, it may be pardonable to quote the words of a prominent biologist to whom this principle of teaching was submitted for criticism: "A statement like—'nature never puts teeth into a mouth that do not belong to that physiognomy,' always arouses my ire. Variation is so thoroughly the rule in nature, not only in individuals, but in parts of individuals, that there is *just as apt to be disharmony as harmony.*"

In this connection it may be interesting to note certain evidences for the theory of far-reaching atavistic heredity, by comparing the physiognomies and jaws of the present quite common bimaxillary protrusion of the dentures,

shown in Fig. 1 with the physiognomies and jaws of early prehistoric peoples, shown in Figs. 2 and 3, which are from a recently published work entitled "Man of the Old Stone Age: Their Environment, Life, and Art," by Henry Fairfield Osborn, of the American Museum of Natural History, and Professor of Anthropology in Columbia University, published by Chas. Scribner's Sons. By permission of the Publishers.

The receding chin was such a predominating characteristic of the early races of the old stone age that they are frequently spoken of as the "chinless men." In other words, their stage of evolution still had left stamped upon them certain characteristics of the teeth and jaws which doubtless had arisen in their anthropoid progenitors from prehensile needs. This consisted in protruding dentures in relation to the maxillæ in which they were placed, a condition of all ape tribes and common to Negroid races. And though this type prevailed ages before the chin development of the mandible, which later characterized the men of the upper palaeolithic age and the present "homo sapiens," it will nevertheless be seen that the facial outlines of these early races

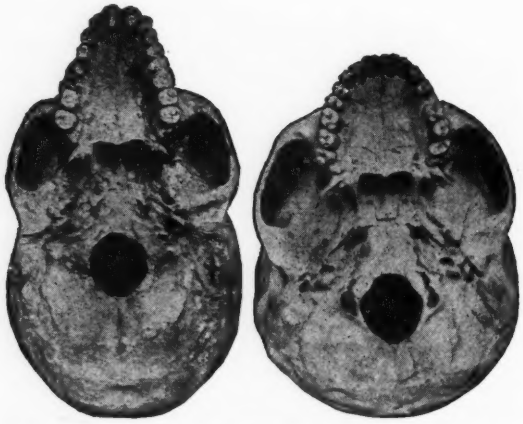


Fig. 5.—View of the under surfaces of skulls, showing difference between Fan Tribe West African Skull and the Caucasian. (Cryer.)

was not far unlike those of many physiognomies of today, which are, from some form of heredity, characterized by the same bimaxillary protrusion of the dentures, or with the same receding chin effect as the chinless men.

In the illustration of a paper read before the 1913 meeting of the National Dental Society, the author presented fifteen cases of bimaxillary protrusion. In nearly all the cases shown, the buccal teeth were as perfect in alignment and occlusion, as we commonly find in normal dentures. With the exception of one of these cases, so far as can be learned, no condition which resembled this character existed with the parents or any of the known forebears; and this was true also of Dr. Cryer's case (see Fig. 4).

One thing which very strongly illustrates the persistent forces of heredity in physical structures and their relations, which have arrived at a condition of equilibration or state of high perfection in relation to environment, is obtained by a careful study of the photographic pictures of the jaws and dentures of prehistoric man, and the scientific restorations found in many of the illustrations of Professor Osborn's book, one of which is shown in Fig. 2. It proves

that the inherited standard type of normal occlusion of the human dentures—contrary to the opinion of many teachers of modern orthodontia—has come down to us essentially unchanged through the ages from the prehistoric men of the "old stone age," and kept in line through "the law of natural selection" ("survival of the fittest"), and its perfect adaptation to needs.

Even as far back as the second "interglacial period"—200,000 to 350,000 years ago—the forms, number, and relative position of the teeth and their buccal occlusion were essentially the same as the standard normal occlusion of today. And though in earlier stages of that vast period, the jaws were of a heavier type and the bimaxillary protrusive mouths, enhanced by chinless mandibles, showed their distant descent from their anthropoid progenitors, the occlusion of the teeth, their alignment and arch form—even the canines which had thrown off nearly all their carniverous characteristics—*were all practically the same as today.* In this connection compare the protruded malposition of the dentures in relation to the maxillæ and mandibles, shown in Fig. 2, illustrative of the men who lived hundreds of thousands of years ago, with illustrations of more recent skulls; first, the Fan Tribe West African

Fig. 6.—Side view of a prognathous negro skull with eighteen teeth in the upper jaw. (Cryer.)

Negro, Figs. 5 and 6, and second, Dr. Cryer's patient, Fig. 4. He assures the author that in the latter case the buccal teeth were in normal occlusion.

There is no doubt in the minds of advanced anthropologists that the form, structure, and relation of the bones of the human skull, like those of other bones of the body, were evolved from beings very much lower in the animal scale, through the unwavering laws of heredity, variation, natural selection, and influences of environment. And that peoples from the very earliest age of man up to the present time, through segregations in distantly located parts of the globe, presenting marked differences of environment, have become, through slight ethnologic variations during many ages, the different races, characterized by distinct types in color and character of skin and hair, and of physical framework of physiognomies.

While there are at present only three markedly distinct races—the white or Caucasian, the yellow or Mongoloid, and the black or Negroid—through admixtures by intertribal relations and more distant migrations, many quite distinct races have been formed, with the production of intervening types, of

which it is said, if they could be collected and compared, would blend into each other with imperceptible gradations.

This is a subject which pertains to the established sciences of stomatology and ethnology—branches of anthropology—which are today taught in our colleges, and which are founded upon many years of patient careful investigations by the most learned scientific minds.

It is shown that the present white race, more than any of the others, is decidedly a mixed race, there being few if any left of the original representatives of the Caucasian type, to which we are accustomed to refer as the standard of beauty and physical perfection. Yet because of the fact that our taste and appreciation of these qualities are being varied under the same adaptive guiding forces of evolution which have characterized the physical, we not uncommonly meet with types which fully accord with our own understanding of manly and womanly beauty and perfection. This doubtless has been true also of all isolated races of peoples, the more primitive of which we would now regard as exceedingly unattractive and perhaps repulsive.

BLUEPRINT CHARTS AS AN AID IN TEACHING OF ORTHODONTIC TECHNIC

By John Rush McCoy, D.D.S.,
Associate Professor of Orthodontia, College of Dentistry of University of Southern California

THE teaching of orthodontic technic in our dental colleges has always been a difficult problem.

In view of the fact that a large proportion of our dental graduates locate in small cities where they are called upon to treat simpler cases of malocclusion, I am a firm believer in a practical course in orthodontic technic which will make them better fitted to handle such cases in an efficient manner.

Any professor of orthodontia who has attempted to present a technic course by means of lectures has encountered considerable difficulty in impressing the student with the details of every step of the work and has found that innumerable questions will be asked, due to the students having misunderstood or forgotten some point in the lectures.

In order to eliminate any questions as to the proper course to pursue, I have prepared drawings, had tracings made, and sufficient blueprints to distribute around the technic room where they can be examined and consulted by the students. They appreciate it and the saving in time for the instructor and the student is considerable as there is no question at any time as to the proper course to follow. The accompanying illustration is reproduced from a photograph of the blueprint tracing, which is much larger, being 16x21 inches.

One reason that many technic courses in the past have been failures is that our profession has been imbued with the idea that an orthodontic appliance must necessarily be of a patented variety, consisting chiefly of screws, nuts, etc., so the students in our best institutions were put to work turning out these mechanical contrivances which were necessarily the product of lathe, tap, and die work and which the student can buy put up in very much better form at the supply house.

For the appliance technic I have selected the very simple lingual arch as demonstrated by Dr. John V. Mershon, consisting of a stable base wire with fine auxiliary springs.

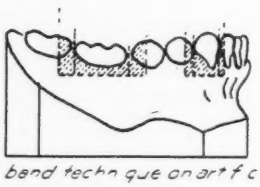
In presenting this to the student it is possible to give him something which is almost universal in adaptability and, thanks to Dr. Mershon, it does not possess any fancy patented features, neither are its virtues placed in the advertising columns of our journals.

For some reason it has been the custom generally to have students construct appliances on plaster models, but owing to the fact that plaster of paris does not have sufficient strength or hardness, this has proved a rather unsatisfactory method. In our technic course we use artificial stone for the

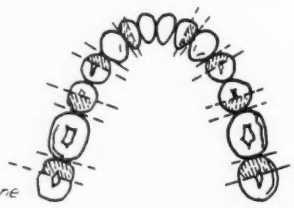
ORTHODONTIA TECHNIC

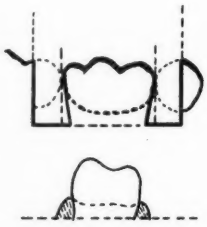
Arranged and Drawn

COLLEGE OF DENTISTRY Univ of So Cal



Orthodontia band technique on artificial stone

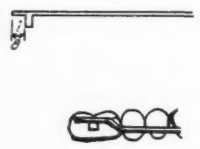




Casts are made of artificial stone First molars and cuspids are isolated to about one to two millimeters below gingival margin It is necessary to use the saw at four points to isolate each tooth At the contact point on either side and at about the middle of the adjoining tooth

After sawing to about one to two millimeters below gingival margin these sections included are removed and the tooth carefully shaped up with chisels to its normal contour when adjacent tissues are removed

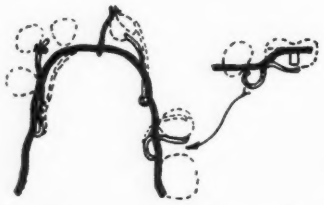
Measurement of greatest diameter of tooth is secured with a fine wire which is cut, straightened out and laid on band material of .18 inches in width and .007 inches thickness for molars Same width and .004 thickness for cuspids

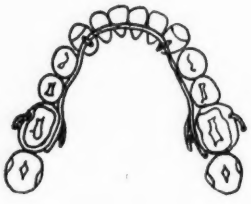


The Mershon Lingual Arch Gold platinum spring wire .036 diameter is cut length of distance from distal of first molar lingually to center of arch anteriorally Solder half round shaft 1/8 of an inch from end of wire
This wire is carefully bent to contour of the arch at gingival margin of the teeth.

A bend is made just anterior to first molar to bring wire to this position From the lower angle of this curve .026 wire is soldered to form a lock
Half round shaft must be removed from tube each time wire is bent to avoid distorting tube When similar wires are bent on each side they are soldered anteriorally while in place on the model

Cuspid bands have spur of .026 soldered lingually so it will rest on arch wire and maintain its position





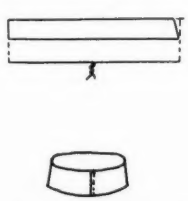
Auxilliary springs are bent so that they occupy position of dotted lines when out of the mouth, so when put to place there will be constant pressure upon the malposed teeth.

All movements are accomplished. Above shows spring bent to lingual to draw cuspid into line. Rotation is accomplished by bending labial and attaching one angle to arch with ligature and applying pressure with auxilliary spring on other angle. Space for impacted bicuspids is opened up with large loop

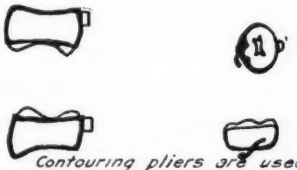
Arch wire in position in lower jaw before auxillary springs are placed Lock wires snap over lower end of half round tube Buccal hooks are placed if mesial movement is desired

Fig. 1.

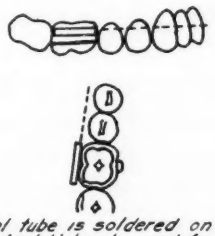
by John R. McCoy, D.D.S. ASSOCIATE PROFESSOR OF ORTHODONTIA



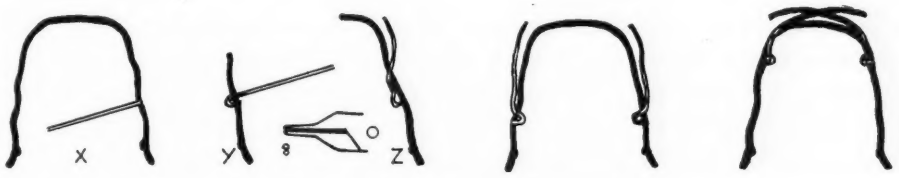
Cut band exact length of measuring wire not allowing for laps as a tight band is desired. One end of band is cut at an angle of about 6° centigrade more or less according to whether tooth is more or less bell-shaped Bands are trimmed to approximate gingival curve on mesial and distal



Contouring pliers are used to bring gingival of bands to snug approximation so it will hug neck of tooth and snap to place Half round tube of .08 inches in length is soldered in middle of lingual, towards gingival in upper and towards occlusal in lower. Buccal hook for intermaxillary elastics is placed where mesial movement of lower jaw may be desired



Buccal tube is soldered on upper band for labial arch, used for distal movement usually. Should be on gingival third of band directed parallel to line of buccal cusps and when arch is placed in it, the arch should lie a little above middle of labial of centrals. Tube is .25 inches long to hold arch of 036 diameter

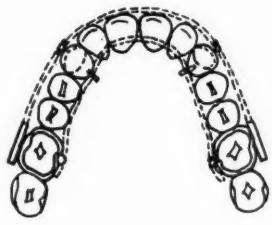


These arches are viewed from gingival toward occlusal. That is, attachments are on gingival side. To place auxilliary springs 022 gold platinum spring wire which has been drawn through a draw plate since annealling and is soldered at right angles to arch as in Fig. X (soldered with 14K solder).

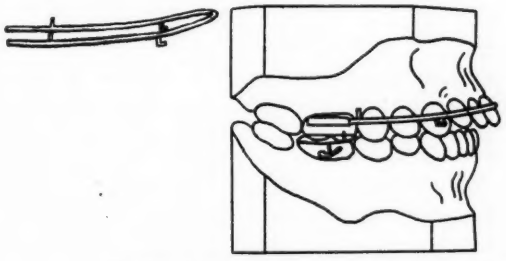
Fig Y Small° nose pliers are used to grasp 022 wire next to arch wire while the .022 is bent back upon itself completely a little more than a half circle

Fig Z Small flat beak pliers grasp 022 wire where it crosses arch wire and hold while it is bent back in direction of arch wire This completes spring

Springs can be placed in any manner desired Placed laterally as at left expansion is obtained When anterior development of arch is desired, a combination of the two as above may be arranged



Upper arch where distal movement is desired Lingual arch used to accomplish development and then labial arch placed. .026 hooks placed opposite cuspids



Combination to be used where lower arch is moved mesially and upper distally A lug is placed on the 036 gold platinum arch wire just anterior to buccal tube so that there will be slight pressure on incisors until they have assumed position and then pressure is transferred to entire arch

Fig. 1.

models upon which the appliances are to be fitted which give a far more stable and unyielding model upon which to adapt the appliances.

The technic followed in the chart is practical in every detail, its being the practice now in our office to make stone models of each case and fit appliances in the manner set forth here, thereby saving the little patients much wear and tear incident to having appliances fitted directly in the mouth.

As to the isolation of the teeth, a fine separating saw should be used at the proximal contact points and a heavier saw elsewhere. When the sections between the points of sawing are removed the ordinary straight enamel chisel is an excellent instrument for shaping the sides of the tooth. A good knowledge of dental anatomy is naturally of considerable value in shaping up the teeth to which bands are to be fitted as the portion of the model representing adjacent soft tissues must be removed, leaving exposed the full crown portion and part of the root portion.

The chart is self-explanatory, but, like all things, it must be followed very carefully as one step omitted would curtail the value of the final results.

Gold-platinum combination spring wire and band material are, of course, the proper materials for the construction of the appliances but one would hardly require a student, unless he so desired, to go to the expense entailed by their use when nickel silver in sizes and forms as shown can be substituted in conjunction with a low fusing solder so that the temper is not drawn from the wires which would at once defeat the object of the appliance.

I am presenting this method because it has aided us considerably and the idea might be of use to some one else who is struggling to teach a dental student some of the essentials of orthodontic technic.

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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CLEFT PALATE AND HARELIP PROCEDURES*

By Truman W. Brophy, M.D., D.D.S., Chicago, Ill.

THERE are two objects to be attained in cleft palate operations: Normal anatomic relations, and correct function. The first step towards normal anatomy is to make use of the separated bones in such a way as to establish just as nearly as possible a normal palatal arch. Now, how can this be done? It certainly cannot be done by closing the lip over the greater congenital deformity and concealing it from view, leaving the patient deformed, to remain so to the end of life. A surgeon who would close the lip first and partially cover the deformity, does his patient, though unconsciously no doubt, an injustice, because the separated bones, no matter how much traction is made by the orbicularis oris muscle in moving them together, will remain separated to the end of life.

If the cleft of the palate is single and if the lip is closed, the long segment of bone will protrude far beyond the short segment and the edges of the alveolar processes will not meet, except in rare cases. In nearly all cases treated in this manner, there is an opening between the mouth and nose where no attempt at union has been made. To so operate is similar to closing a wound over a fracture and allowing the fracture to go without a splint. It is unnecessary to state that no surgeon would operate without adjusting the fragments and immobilizing them in the doing of this operation. Cleft palate surgery, when the palate is completely separated, is *always* bone surgery and the time must come when all will appreciate this fact and practice this course of procedure in order to secure normality. If the surgeon succeeds in getting the lip closed over an extensively protruding premaxillary bone, still the deformity exists within the mouth, though covered up, and the patient will have a monkey-face so long as he lives.

*Read before the Southern Minnesota Medical Association, Mankato, November, 1920. Reprinted by permission from Minnesota Medicine, May, 1921.

When well understood, I regard the moving of the bones into proximity as one of the most satisfactory operations in surgery. Men who are not familiar with this work and who have not followed the hospital records, have claimed that the mortality is very high. Out of 577 patients under one year operated during the past five years, for the approximation of the maxillary bones and the carrying of the premaxillary bones into proper position, I have lost 16 patients. I attribute the low mortality of 2.77 per cent in these cases to the fact that shock is less severe following an operation at this age than it would be between 12 and 18 months, and further to the fact that I will not operate upon any patient unless he is in satisfactory condition. Patients of this age must be in

Fig. 1.—The monkey-face. This child had protruding premaxillary bones. An effort was made to close the lip over them, with the result illustrated. The boy could not close the lip except with the greatest difficulty. His mouth was constantly open. The deformity following operation was nearly as great as the one which the surgeon undertook to correct.

the hospital under observation not less than 3 days, have a physical examination and must be gaining in weight.

A study of the thymus gland is of great importance. We know that status thymico-lymphaticus is a serious menace to surgical procedure in young children. I do not regard the surgical risk as great in infants under 5 months as between 6 months and 3 years. In December 1919 I lost a patient 18 months old, following an operation. The patient had been prepared as usual. He was large and vigorous. The child died suddenly. The autopsy revealed an enlarged thymus gland and status lymphaticus. As a precaution against such unfortu-

nate events I have adopted as a routine measure the making of a radiograph of the child's chest so as to determine whether the thymus is of normal size. Percussion will fairly well outline the borders of the gland, but the x-ray is conclusive. If the gland is enlarged, operation should be deferred. Often one treatment of x-ray will be sufficient to reduce the gland to normal size, after which the operation may be made, usually within 6 weeks.

Acidosis is responsible for many ailments. An examination of the urine should be, of course, included in the physical examination, but it is always well to anticipate acidosis and make use of sodium bicarbonate in small doses frequently given, for several days before operation. A dram may be dis-

Fig. 2.—Profile of same child, showing the extreme prominence of the lip, due to a misconception of the proper treatment of the protruding premaxillary bones. The surgeon did not realize that the protruding premaxillæ called for bone surgery, which should always be the first step in correcting the deformity.

solved in one-half pint of water and a teaspoonful given to young infants every two hours. We irrigate the mouth and spray the nose with a solution of boracic acid.

Formerly it was my custom to operate in the morning, the patient being allowed no food. More recently it has been my practice to give children a half ration breakfast at about 5:30 a. m., operating at 9:30. I believe that the food received at this time is of great advantage in giving the child strength and better fitting him for the anesthetic.

The anesthetic used is ether, although I prefer chloroform. But the

general objection to chloroform and the difficulty in having it administered properly has led me to use ether exclusively. I would like to say in this connection that chloroform, properly administered, is, in my opinion, the best anesthetic known. Medical teaching in this country is, however, against it. In fact, our medical institutions do not teach its use and it would not be fair to a patient to have an anesthetic administered that is not understood. In my experience in France during the war, I never saw any other anesthetic than chloroform administered in the French and English hospitals.

In 1885, having become familiar with the methods employed generally by surgeons throughout the world and having studied the deformity from every

Fig. 3.—The protruding premaxillary bones in this child were moved back into their correct position by making an oblique incision through the vomer. The edges were freshened, as well as the edges of the maxillary bones. Two strong wires were carried through the maxillary bones, and anterior to the premaxillary bones beneath the maxillary periosteum. These bones were firmly immobilized. The soft parts over the freshened surfaces of the bones were sutured with horse hair. Fifteen months later, the imperfections of the lip were removed, the vermilion border corrected, and the dilated nostrils were normal. From the ugly appearance that he presented in Fig. 1, we have in Fig. 3 a handsome boy.

point of view, I concluded that the time best suited to close a cleft palate was as early after birth as it was possible to operate. The basis of my belief was that a cleft might be closed by a little pressure immediately after birth, whereas six months later the bones would be so ossified that the moving of them together would be attended with difficulty and, besides, the results of the work would not be as satisfactory. A cleft palate is a fissure, a separation, nearly always of well developed parts, not (with few exceptions) the

result of *arrested development, nor failure of the normal quantity of tissue to enter into its structure.* It is practically a wound. I hold, therefore, that *it should be closed in early infancy when it can be accomplished most easily.* Our text books and professors of surgery, with few exceptions, teach, if they teach it at all, that congenital harelip should be operated upon in early infancy and that no attempt should be made to close a cleft palate until the child is several years old. The practice and teachings of surgeons of highest repute have led medical men, in some instances, to advise those seeking information as to the most desirable time to operate for harelip and cleft palate, to have the lip operation performed at once and to postpone the palate operation until the child

Fig. 4.—Here we have a profile showing the great improvement made in this lad by moving the bones into proper position and correcting the lip.

is from 3 to 10 years old. I have endeavored not only to overcome the objections raised to early operations, but also to avoid difficulties with which the older surgeons contended. *After 35 years of study and clinical experience, I am satisfied that the most desirable time for operating upon cleft palate is within three months after birth. At that time we are able to secure more satisfactory results than in later life and we also avoid the objections usually raised by surgical writers.*

Within the past four years I have ventured to approximate the bones that were widely separated, with protruding premaxillary bones, in patients beyond infancy. A patient 5 years old who came to me, with extensively protruding

premaxillary bones and a complete cleft, was treated by moving the bones backward and approximating them, afterwards closing the lip. A child of 14 months who came into my practice about 2 years ago, had an extensive cleft of the palate in the median line. There was a complete separation of the premaxillary bones, leaving a central incisor tooth on each side of the fissure. The upper arch was so broad that the teeth of the lower arch were completely telescoped by the upper, the lower teeth coming in contact with the mucosa covering the hard palate. This was indeed a problem. I resolved to approximate the bones. I carried 6 strong silver wire sutures through the maxillary bones, using 2 heavy lead plates (No. 13 American gauge), each

Fig. 5.—Extensive protrusion of premaxillary bones, double harelip, and cleft of the palate.

perforated with 3 holes admitting 2 wires through each hole. These wires were brought together and twisted. As much force was used as I thought advisable, and I could see a slight moving of the bones under pressure. Ten days later, the patient was again anesthetized, the slack taken out of the wires and they were twisted again. So, by twisting the wires about every 10 days or 2 weeks, extending over a period of 3½ months, I was enabled to bring the bones into proximity.

I am now convinced that any patient up to 15 or 20 years may have these broadly separated bones approximated if the surgeon will take time enough, by moving them little by little and from time to time. We know that the

orthodontist is able, by moving teeth slowly, to bring them into almost any position desired. The same is true of bone. In fact, bone having in it a large amount of cancellated tissue, is far more easily moved than teeth.

Nevertheless, in the light of surgical advancement and development of modern methods of procedure, *no cleft palate patient should be permitted to attain an age when speech is attempted without having an operation performed and the defect removed.* Students must no longer be taught methods which should be obsolete in this field of surgery; they must not permit the deformity to remain without attention; they must qualify themselves in modern methods

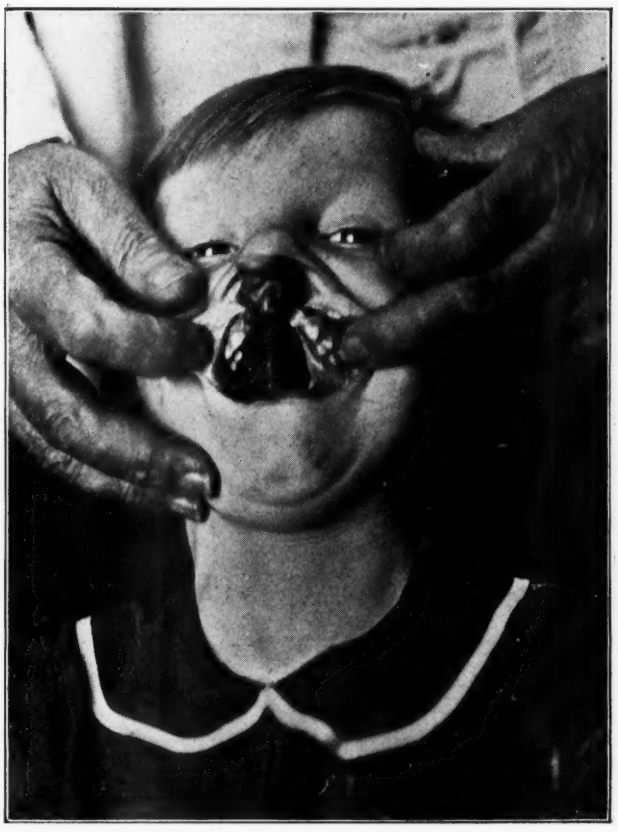

Fig. 6.—Interior of mouth, showing protrusion of bones, double harelip, and cleft palate. A pulpless, loose tooth is visible. This was removed before the first operation.

in this special surgical work as they do in other departments of surgery. Having, then, in mind the anatomical defects of the palate, they should seek to overcome them, *bring the abnormal anatomical parts in normality and thus establish more perfect functional results.*

The second object of palatal surgery is correct function. We cannot secure function unless we secure a good palate—a palate long enough to pass backward to the postpharyngeal wall; the posterior palate must be safe, flexible and resilient. Such a palate cannot be secured when large lateral incisions with a view to relieving tension are made in its structure. The Langenbeck incisions should not be made. They are unnecessary. There are nine reasons why these

incisions should not be made and not *one* good one why they should be made. With lead plates, wire tension sutures and horsehair coaptation sutures, a good palate may be made. When the palate fails to unite, it is due usually to a failure in the operation. If the palate is raised back as far as the styloid process of the temporal bone and hamular process of the sphenoid bone, it will be redundant. When denuded from the hard palate it will drop down and the edges meet without tension. After adults and younger persons have been operated, they often think they should speak perfectly at once. It will be quite impossible, in the time at my command, to enter upon a description of the methods

Fig. 7.—Premaxillary bones brought into correct position, the edges freshened in both premaxillary and maxillary bones, perfectly immobilized by wiring them in place.

employed in training a patient, who has been operated after defective speech habits have been acquired, to speak well.

The study of eugenics is intensely interesting, and points unerringly to the inheritance of congenital defects. In a communication recently received from Dr. Chas. B. Davenport, Director of the Eugenics Record Office, Cold Springs Harbor, Long Island, New York, he says:

"Of the 2,500,000 men examined (for army service), including 500,000 rejected, there were recorded 1183 cases of cleft palate and 283 of harelip." It would be impossible to enumerate all the states where statistics have been gathered. I give only a few.

State	Cases	per M
Vermont	13	1.55
Maine	29	1.49
North Dakota	18	1.01
Illinois	68	.38
Arkansas	7	.16

"The defect is commonest in agricultural sections of the north, 0.88 per M.; in negro sections, 0.35 per M.; in mountain sections, 0.59 per M., and in desert sections, 0.33 per M."

In considering these figures regarding the frequency of cleft palate, we

Fig. 8.—Profile of boy after the premaxillary bones were united to the maxillary bones.

must remember that those included were young men undergoing examination for the army, between the ages of 21 and 32 and we do not take into account the enormous group from early infancy to 21. It is only fair to estimate that a far greater number of cleft palates are under the age of 21 than over. Christopher Heath, the English surgeon, made the statement many years ago that nearly 50 per cent of cleft palate infants died of starvation since they could not perform the function of deglutition. This being the case, instead of there being 1183 cases of cleft palate in the United States, there would be many, many times that number.

It is well understood that complicated, tripartite cleft palate, with harelip, is the most conspicuous deformity known to mankind, and realizing the fact

that this deformity is the least understood and the most unsatisfactorily treated in the whole field of surgery, we seek for a reason. There is one, which must be apparent to every observing surgeon. In 1915 I requested my publishers, P. Blakiston's Son & Company, to write to the leading medical colleges of the U. S. and ask the following questions: "Have you a Professor of Oral Surgery?" and "How many lecture hours per year and how many clinical hours in Oral Surgery are given?" Out of 64 replies, 6 were in the affirmative as to having a chair of oral surgery. This accounts for the apathy on the part of medical practitioners generally, in regard to this subject, since they have not, as medical students, had an opportunity to learn.

Fig. 9.—Front view, showing double harelip and broadly flattened nose, the breadth being greater than the length.

I was recently asked by a distinguished educator, not a physician, what I thought was most needed in the department of medicine. I said to him, "Doctor, my answer is very plain. What the medical student most needs, in my opinion, is to learn how to take care of his patients." So long as only 6 out of 64 of our foremost medical colleges have in them chairs of oral surgery; so long as the interns, who are among the best men from our colleges, have no knowledge of the work we are here discussing, we can expect only such disastrous results as have been exhibited here today, in many cases, instead of having these deformities treated with the same knowledge, the

same care and the same skill as we get in the treatment of other ailments and deformities of mankind. I do not wish to charge the young practitioner with negligence in this work because I know that if an opportunity had been placed before him and if he had been required to pursue these studies, he would at least recognize and follow a practice that would not leave the patients, as we sometimes see, in a worse condition than they were before they were operated.

Higher medical education—increasing the requirements for admission and for premedical training, increasing the facilities for laboratory work, strengthening the faculties by bringing in men who have been thoroughly trained in their respective departments—has advanced most satisfactorily during the past decade, but the clinical facilities have not kept pace; postgraduate work, while not up to the highest standard, has done much to aid the practitioner in the care of his patient. Why should oral surgery not be included?

Fig. 10.—Nose lifted, after the lip was closed.

It must be apparent to all that the greatest obstacle in the way of success in the field of oral surgery, and I might say oral pathology and surgery, lies in the fact that, as I have pointed out, there is failure on the part of medical colleges to teach thoroughly these important subjects. The many mistakes made in this field must cease; deformed humanity is entitled to better surgical results.

Dr. Chas. Mayo said in Chicago some years ago when addressing the Chicago Dental Society, "The next great move in preventive medicine will be accomplished by the dentists of our country. Will you do it?" To do it calls for a thorough training not only in dental histology, physiology, anatomy and pathology, but they must do more than this. They must have a thorough training in general pathology and antiseptic surgery.

Fig. 11.—Construction of palate, lip and nose completed. It will be seen that the nose in Fig. 9 is nearly twice as broad as in Fig. 11.

When the dental colleges of our country come up to this high standard suggested by Doctor Mayo; when the medical institutions demand as a part of the curriculum a training as thorough in oral pathology and surgery as they do in the departments of the eye, ear, nose, throat and cutaneous diseases, et cetera,—then, the innumerable errors now committed in the management of harelip and cleft palate will end.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Under the Editorial Supervision of

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It is the object of this department to publish each month original articles on dental and oral radiography. The editors earnestly request the cooperation of the profession and will gladly consider for publication papers on this subject of interest to the dental profession. Articles with illustrations especially solicited.

DENTAL STEREOROENTGENOGRAPHY

BY C. A. LEMASTER, D.D.S., ST. LOUIS, MO.

Professor of Roentgenology, St. Louis Dental College

THE application of the principle of stereoscopy to roentgenology is not novel; it is employed with success, good, poor and indifferent. Its value has been grossly underestimated by some and correspondingly exaggerated by others. The indisputable fact remains, that a simple roentgenogram (radiogram) is a flat record of superimposed shadows while a stereoroentgenogram is a record of those same shadows arranged in their proper perspective planes. From which it follows that stereoroentgenography may be used with great advantage wherever the subject for examination calls for differentiation of structures lying in various planes or depth. Keeping this last idea in mind, namely, the differentiation of structures lying in various planes or depth, we can readily see that examinations of this character are of great value to the orthodontist and exodontist especially, for their work requires the most thorough and accurate knowledge of all of the structures of the oral cavity, especially the relation of one tooth to another, its position in the arch, and its proximity to the adjoining teeth and structures.

Singularly enough, stereoroentgenography has been employed very little in its application of dental roentgenology (radiodontia). Extraoral stereos have been made for some time with success, but we all know the value of the intraoral roentgenogram over the extraoral kind for the average dental conditions; the technical difficulties in making two successive exposures with the film placed each time in accurately the same position within the mouth, the slightest motion by the patient between exposures, the accuracy of the central ray, the shift of the tube and stand, the difficulty of viewing, as some individuals cannot view stereoscopically, and the accuracy in mounting the finished roentgenogram all may partially account for this. Also the lack of apprecia-

tion of many dentists of the additional information which may be secured by its aid.

The purpose of this brief article is not to deal with matters pertaining to technic; rather it is the desire of the writer to illustrate and emphasize the benefits which may be obtained from a judicious use of the principle of perspective in dental roentgenology.

Even at the risk of inviting protestation and argument to the contrary, it must be stated with emphasis that the application of one of the most fundamental of everyday optical laws in the study of a roentgenogram will often prove deceptive and misleading. From infancy on we are wont to associate things we see clearly and distinctly with nearness, those we see more faintly with greater distance. This is scarcely a matter of reasoning—it is a matter of instinct born with experience. Yet to arrive at a similar conclusion, in the interpretation of a roentgenogram will prove faulty as often as not. Why? Because distance plays no particular rôle there, generally speaking. If an unerupted cuspid shows clearer and more distinctly than a deciduous one it is no indication that it lies nearer to the film, that is lingually, than the deciduous one. It only means that its specific gravity is greater, that it offered greater resistance to the passage of the roentgen rays, that its outline appears more sharply marked because it is more sharply outlined. And yet how often are these findings misinterpreted. Another instance might help to illustrate: A broken off piece of steel broach slipped down between the side of the tooth and the process. Three out of four who examine such a roentgenogram will immediately arrive at the conclusion that the broach lies closer to the film—lingually, than the tooth. Why? Because it shows denser and more sharply outlined; because they invoke the almost instinctive association of things clearly visible with things near. And they may be right and again they may be wrong. Purely a matter of luck; luck is all very well, to be sure—but to have one's gums explored just on luck! The truth of the matter is that this piece of broach would appear the same on a roentgenogram, if it was on the buccal, labial or lingual surface of the tooth. Only two means exist which will avoid such errors; a number of roentgenograms may be made, from different angles, possibly at right angles to each other, or by means of stereoroentgenography. The latter has the advantage of speed, convenience, and superiority of results since it is often quite difficult to secure right angle roentgenograms within the mouth due to the superimposition of the teeth and bony structures and the heavy bony plates of the skull.

Briefly there are three groups of examinations where flat pictures are usually unreliable:

1. Localization of foreign bodies,
2. Orthodontic cases,
3. Exodontia cases,

and we might include the definite localization of periapical destruction.

Fig. 1.—Dried specimen.

Fig. 2.—Dried specimen. Stereoroentgenograms. View stereoscopically.*

*To view prints cut out the print and mount on a card board and view through hand stereoscope.

Fig. 3.—Actual case. Upper teeth. Stereoroentgenogram.

Fig. 4.—Actual case. Upper teeth. Stereoroentgenogram.

Fig. 5.—Actual case. Upper teeth. Stereoroentgenogram.

Fig. 6.—Actual case. Upper teeth. Stereoroentgenogram.

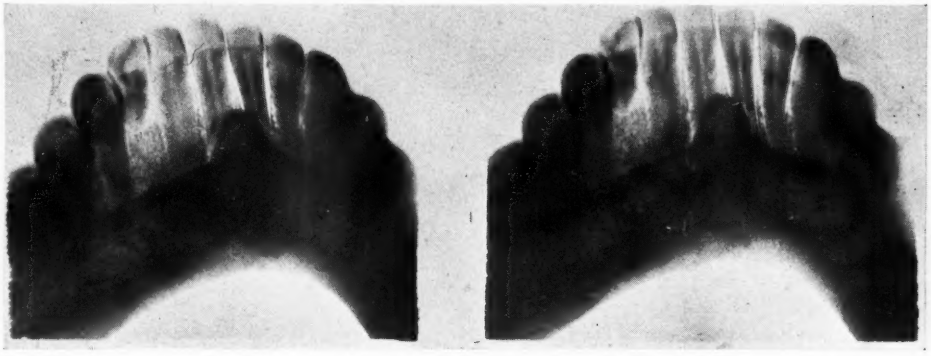

Fig. 7.—Actual case. Lower teeth. Stereoroentgenogram.

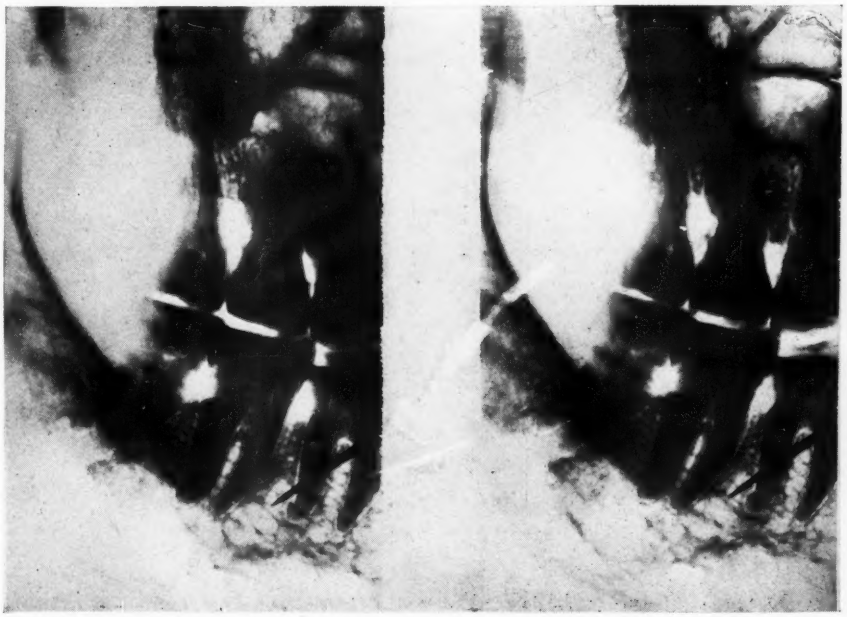

Fig. 8.—Dried specimen. Lower teeth. Buccal aspect stereoroentgenograms.

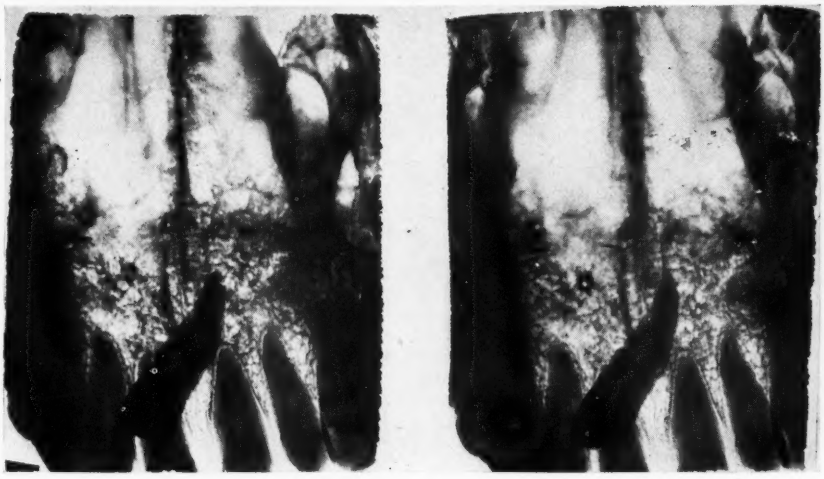

Fig. 9.—Dried specimen. Upper teeth. Stereoroentgenogram.

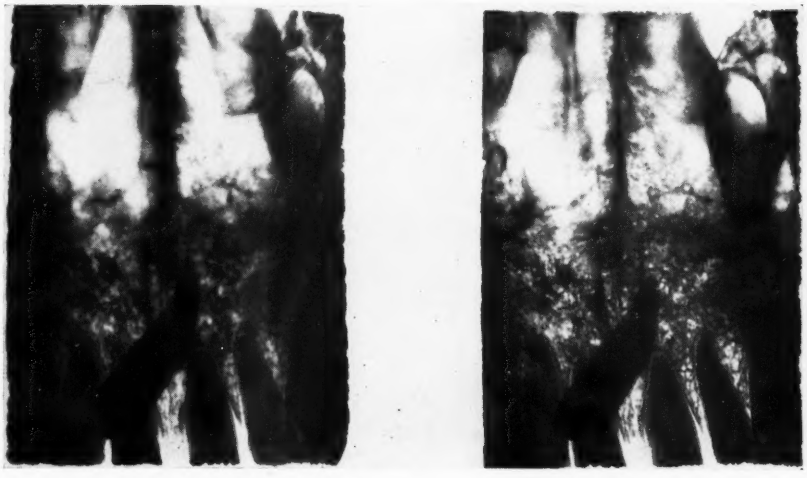

Fig. 10.—Dried specimen. Upper teeth. Stereoroentgenogram.

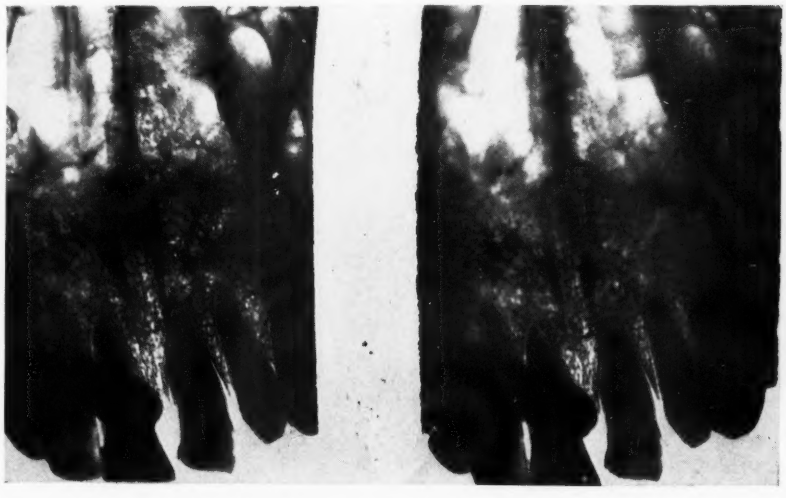

Fig. 11.—Dried specimen. Upper teeth. Stereoroentgenogram.

1. LOCALIZATION OF FOREIGN BODIES

As mentioned before the usual methods of localization cannot as a rule be used when localizing a foreign body in or around the teeth, this especially is true in the upper maxilla, jaw. In the mandible, occlusal bite roentgenograms can be easily made and then a right angle roentgenogram made with the film held against the process, regular intraoral method. However, in the maxilla, upper jaw, it is different, especially if the upper anterior teeth protrude and an unerupted tooth or foreign substance is to be localized in this area, which necessitates making the exposure through the thickest part of the skull to obtain a *true* occlusal roentgenogram. A roentgenogram of this type will show the displacement of the foreign body in relation to its being lingual, buccal, or labial to the teeth, but the average exposure in a case as described above is usually prohibitive. Fig. 1 shows the upper occlusal method of localization. Fig. 2 of same case, dried specimen, Stereoroentgenograms. Fig. 1 simply gives the displacement or relation of the unerupted teeth in their lingual position, does not give its relation to the surrounding structures or its long axis position in the process. Fig. 2 which can be viewed stereoscopically, gives the position of the unerupted right upper cuspid, viewed from the lingual aspect, lingually to erupted teeth, also its relative position to the surrounding teeth can be noted, a definite idea as to its line of eruption, in fact one can *see* its *position.* As further example, might be mentioned the following case: During the injection for nerve blocking the tip of the hypodermic needle broke. A preliminary roentgenogram showed it supposedly lying superimposed to the upper right second molar, third molar missing. It may be added that as always the needle appeared lingually, though in this case it was known to lie buccally. Further stereoroentgenograms disclosed the needle considerably posterior to the second molar, as well as superior and sharply inclined; the point of the needle lies upwards, whereas the proximal end was only a little removed from the surface of the gums. Exploration based on flat roentgenograms proved unsuccessful; after correction by means of perspective, stereoroentgenograms, the needle was removed without more than ordinary difficulties.

2. ORTHODONTIA

In this branch of our profession the utmost care is necessary to absolutely know one's field before commencing upon a case, if there is anything that will give the orthodontist a clearer and more comprehensive idea of the case in hand than the method of stereoroentgenography, I would be very happy to obtain this method. All of the illustrations in this article are true stereoroentgenograms. This will suffice in explaining the value of this method to the orthodontist as these prints are mounted to be viewed stereoscopically. Use a small hand stereoscope; cut out the prints, mount upon a piece of cardboard, and hold so that the reflected light will fall upon the face of the print.

3. EXODONTIA

Stereoroentgenograms are of practical value in localizing the tooth to be extracted; just as the medical surgeon wants foreign objects localized before the operation, so the exodontist who wishes to remove the tooth or teeth with as little trauma as possible wishes to have the object to be removed, before his eyes, if it can be done. Just view the prints.

Fig. 3, lingual aspect view, left upper central incisor, unerupted and situated lingually to erupted teeth, tooth is rotated.

Fig. 4, lingual aspect view, left upper cuspid, unerupted, lingual to anterior teeth, apex of root superior and buccal to apex of second bicuspid.

Fig. 5, lingual aspect view, cuspids upper right and left side, unerupted, lingual to anterior teeth.

Fig. 6, lingual aspect view, upper anterior teeth. Left upper lateral incisor area. Large area of the process destroyed; shows definite area of destruction between central incisors communicating with the larger area in the lateral incisor process; cuspid and first bicuspids involved.

Fig. 7, lingual aspect view. Lower anterior teeth. Left cuspid shown unerupted, misplaced lingually, far removed from the erupted teeth.

Fig. 8, dried specimen, buccal aspect view, that is, viewing from the buccal surface instead of from the lingual surface. Taken to determine position of the needle. Is it buccal, lingual or where to the left lower molar? View the stereoroentgenograms and you will know.

Fig. 9, dried specimen, lingual aspect view. Cuspid viewed stereoscopically, which shows it to be far removed lingually from the erupted teeth; it appears towards the person viewing, which is actually true, as I glued the cuspid to the palate before making the exposures.

Fig. 10, dried specimen, lingual aspect view. Same case as above, duplicate pictures improperly mounted. This gives the viewer a pseudostereoscopic view, the cuspid now appears to lie on the labial surface of arch. This is shown simply to illustrate what improper mounting does. Every true stereoroentgenogram should do this.

Fig. 11, dried specimen, lingual aspect view, upper anterior teeth, shows left upper cuspid displaced labially, far removed from the erupted teeth. This tooth was glued to place on the labial surface before making the exposures.

These few examples selected at random should offer proof of the statement made: That stereoroentgenography as applied to dental roentgenology is of unquestionable value wherever the peculiarities of the case demand accuracy in the differentiation between the various planes in which the structures to be studied come to lie. That little or no valid excuse may be found for the apparent neglect of dental roentgenologists in employing this important branch of their specialty, unless it be the general lack of demand for it. If so, may we not justly consider it as part of our duty in familiarizing the dentist with the vast benefits he is sure to derive from the judicious use of the additional value which perspective adds or lends to the roentgenogram.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Presence of Teeth at Birth. H. T. Fauconnier. Revue Belge de Stomatologie, 1920, xviii, No. 8, p. 334.

This observation upon a female child born in June of 1920 is reported as a curiosity. A wax plate was obtained on the eighteenth day, and showed the two lower central incisors half emerged from the alveolar border. The two teeth were healthy but were rotated in such a way as to encroach upon each other, their incisor margins being directed obliquely from before backwards and from right to left. This child has eight brothers and sisters none of whom possessed teeth at the time of birth. This dental eruption during intrauterine life, although not altogether exceptional, is nevertheless quite uncommon. It is claimed by some observers, however, but without proofs in support of their statement, that this occurrence is more frequent than is generally believed. Both anatomists and accoucheurs have reported the presence of teeth at birth. Testut writes that children have been born possessing one or several teeth, but that these cases are very exceptional. Some observations of this kind are historical: Richard III, Louis XIV, Mazorin, Mirabeau, were born with teeth. The rarity of this phenomenon is illustrated by the fact that the above observation is the only one in a material of 3500 infants seen in the service of Dr. Sagher in Liege, Belgium.

As regards the sequelæ which may result from this abnormal dental eruption these are usually absent, as in the author's observation. Sometimes, however, chronic ulcerations of the infant's tongue may follow, occasionally requiring the extraction of the teeth. More frequently, the resulting disturbances concern the mother, the nipple being bitten by the nursing child and requiring adequate protection by shields or other contrivances.

Modern Orthodontics in General Practice. G. F. Cale-Matthews. The Dental Record, 1920, xl, No. 10, p. 621.

In this paper which was read before the Liverpool and District Odontological Society, the author said that in the three years preceding the war, when orthodontics was placed on a recognized basis in the Birmingham School and he took charge of that department, just over five hundred cases passed

through his hands. Today the difficulty is to get cases for the students. It is quite possible for the general practitioner to practice orthodontics in a scientific manner and to be assured of some definite results in the cases taken. Not all classes of cases should be attempted, however, for many exact the utmost skill of the specialist. The restoration of occlusion is the aim of the orthodontist, and the older idea of the regulation of individually misplaced teeth must be discarded. The ideal of orthodontics of today is primarily to correct and to establish occlusion. This establishment of occlusion means beauty of contour, both of the arches and of the face. What an enormous factor in the improvement of facial lines the denture is, only those who have practiced orthodontics will realize. The restoration of the correct occlusion helps to keep the denture clean and healthy. With regard to the age question, the author does not favor treating young children; in his opinion a child of under seven or eight years old is too young to be hampered with appliances in the mouth. The individual teeth are a very minor matter, it is the correction of the relation of the arches which is important. Having once established the relations, the correction of individual teeth is a very simple matter. Apparatus is left to ingenuity and choice of the orthodontist. The lecture was enriched by a screen display of a large number of slides illustrative of orthodontic treatment in cases which had come within the scope of the author's practice.

Mothers' Milk and Better Teeth. Th. T. Ryan. American Medicine, 1920, xxvi, p. 646.

The importance of breast feeding from the dental standpoint is emphasized by the author, who maintains that the mother is the only source from which the child's physical and dental equipment can be obtained. If her milk is deficient in any essential qualities, the mother should endeavor to increase and improve the supply by appropriate dietetic measures (milk, chocolate, vegetable oils). Milk provided from any source other than the mother undergoes a chemical change, especially when pasteurized or even heated to a temperature above body heat. Its protein constituents and the mineral salts so necessary to the development of the child's teeth and other body structures, become partly disorganized. Pasteurized milk is not so digestible, the casein being rendered more tough and difficult of digestion; clean raw milk is always a better food than treated milk. The teeth of a baby fed on a milk modification deficient in lime will erupt tardily and irregularly; for teeth require organic phosphates, particularly phosphates of calcium as well as carbonates of lime, more than any other part of the body.

Treatment of Alveolar Fistulas of the Antrum of Highmore. C. F. Welty. La Odontologia, 1920, xxix, No. 11, p. 477.

The patient was a man of 35 years of age, who had had a tooth extracted ten years previously. The antrum of Highmore became infected and since that time had suppurated through the fistular orifice of the alveolar margin. Several unsuccessful attempts were made to close the fistular tract. Three days before the

patient came under observation, an acute exacerbation of the antral infection had occurred, he had chills and fever, and felt quite ill, but was in good physical condition. The nose was filled with fetid pus, and the nasal septum was durated to the right. Neither hypertrophy nor polyps were present. Two teeth had already been extracted at the site of the fistula. Radical operation of the antrum was recommended, as well as correction of the septum and extirpation of the tonsils. The last two conditions were operated upon and healed readily. The antrum of Highmore was very large and nearly filled with polypoid masses and fetid pus. The root of one tooth had not been removed and was impacted in the polypoid mass on the floor of the antrum. Two other exposed and carious roots of the same tooth projected into the cavity. Not much of the alveolar border was left in this locality. The tooth, which obstructed the fistulas opening, was extracted, in the expectation that the surface would become adherent, and the operation was terminated in the usual manner. In the course of three weeks, the antrum became entirely well, but the fistula was larger than ever. A radiogram of the jaw, taken at this time showed that the last tooth which was left on this side had a root abscess and that the part corresponding to the fistula was completely exposed. Although this tooth was cured, the fistula continued to increase in size, without a tendency to heal. It then occurred to the author that a procedure like that for cleft palate was the only way to close the antrum permanently, and he accordingly proceeded as follows: Under general anesthesia, an incision was applied at each end of the fistula on the outer side of the alveolus, passing back to where the bone had been extirpated in the operation on the antrum of Highmore. The periosteum and the mucosa of the alveoli were detached and the entire alveolar margin as far as the antrum of Highmore. A similar incision was applied inwards at each end of the fistula, raising the periosteum and the mucosa from the bone and removing the latter. There remained an opening 3.75 cm. in width, through which the finger could be introduced, penetrating into the antrum of Highmore. An incision was then applied in the median line of the hard palate in its entire length, raising the periosteum over this entire area. It is readily understood that with this procedure, there could be no tension on insertion of the sutures. These could be removed ten days later, and it was found that complete union had occurred. The author has since had a very similar case, in which equally satisfactory results were obtained. Numerous individuals suffering from fistulas of the antrum of Highmore could be easily cured in the manner described above. The author emphasizes, however, that the radical operation must be performed on the antrum of Highmore, preferably with the above modification, and good results must have been obtained, before the last procedure is attempted.

Peripheral Lingual Paralysis Following Gunshot Injury. F. Peyser. Deutsche Zeitschrift für Chirurgie, 1920, clviii, 145.

Bilateral peripheral paralysis of the hypoglossus is apparently very rare, although bilateral central paralysis of this nerve is not uncommon, especially in affections of the medulla oblongata, the nuclei of the twelfth pair of cranial

nerves lying so close together that a focus as small as a pea may lead to bilateral paralysis of this nerve. The enormous material of the world-war has contributed also a few cases of bilateral peripheral paralysis of the hypoglossus. The authors' personal observation concerned a soldier thirty years of age, who was struck by an aviator's bomb, the entrance-orifice being a thumb's width to the right of the chin, directly above the free border of the lower jaw. The exit-orifice was situated close behind the left angle of the lower jaw. Judging from the size of the orifices, the splinter of the projectile must have been about the size of a cherry. The lower jaw was found to be fractured close to the mental portion on the right side, and in the anterior third of the horizontal ramus on the left side. The tongue was badly swollen and hung entirely motionless out of the patient's mouth. He had to be nourished by means of a rubber tube which was pushed far into the pharynx. Speech was altogether lost, and respiration was extremely difficult. At first there was profuse salivation which gradually improved somewhat. Two months later, he began to speak and after seven months was able to speak fairly well, although slowly and with difficulty. The left mandibular fracture healed spontaneously in good position, whereas, on the right side a pseudarthrosis of the lower jaw developed, which required correction by means of free bone-plastics from the pelvic crest. The tongue gradually became retracted into the buccal cavity in the course of three months, but it remained completely paralyzed. Fifteen months later, the tongue lay motionless and flaccid on the floor of the mouth, with its left side much more voluminous than the right side, which was markedly atrophic from the tip to the root of the tongue.

Sublingual Ranula. C. D. Avellanal. (Buenos Aires). Revista Dental, 1920, xiii, No. 10, p. 302.

There are three varieties of this disease: ranula of the newborn; common or sublingual ranula; and suprahyoid ranula. The first variety is extremely rare and usually due to an occlusion of Wharton's duct. Simple incision of the swelling permits the passage of the saliva, and the ranula disappears. Sublingual ranula begins isidiously and the bearer notices accidentally the presence of a tumor. When fully developed, sublingual ranula is often sharply circumscribed, but sometimes passes beyond the median line, the tumor then taking a bilobular form. In size it varies from the volume of a nut to that of a hen's egg. The tumor is round, bluish-white in color, fluctuating, and completely reducible by pressure when a communicating suprahyoid sac is present. It is painless, but sometimes it acquires such a large size as to push the tongue backward and upward, thereby giving rise to disturbances of swallowing and speech. Under these conditions the tumor may rupture, and a spontaneous cure may result; as a rule the opening closes and the ranula heals. In certain exceptional cases, the ranula may become inflamed and undergo suppuration. Ranulas are distinguished from other cystic tumors of the floor of the mouth by their shape, transparency, fluctuation, and especially by exploratory puncture, which permits the escape of clear viscid fluid.

It differs from a lipoma of the floor of the mouth, which is less superficial, of pasty consistence, and not fluctuating; from a lymphangioma, which appears in the newborn, spreads rapidly, and forms a regular distinctly outlined tumor. The prognosis is not serious, but recurrences are common. As to treatment, puncture followed by injection of curative fluids is insufficient, the ranula returning in the majority of the cases. Incision and cauterization are likewise followed by very frequent recurrences. Removal of the protruding portion of the cystic pouch is not always sufficient. It is necessary to extirpate the entire ranula and to make the excision sufficiently deep and extensive, for the germs of recurrences are found in this region. Uncomplicated suprahyoid ranulas can be extracted by the cutaneous route.

Paradental Cyst of the Mandible in a Child. Coustaing and Crocquefer. La Revue de Stomatologie, 1920, xxii, No. 11, p. 648.

The patient, a girl fourteen years of age, was seen in the St. Louis Hospital, with a painless tumor situated in the left lower portion of the face. This swelling did not attract attention until a year ago, when the patient suffered for several consecutive days from toothache. On examination of the face, a deformity was noted in the middle portion of the horizontal ramus of the left mandible, without pain, redness, or heat. In the alveolus of the same side protruded a painless fluctuating tumor, without a change in color of the mucosa, the size of a pigeon's egg, referable to the six years' tooth which was reduced to its infected roots, extending from the first small molar to the twelve years' tooth. The onset of this tumor presumably dated much farther back than the attack of toothache, so that its development had been a very gradual one before the present stage of deformity was reached. This peculiarity, in combination with other signs, contraindicated acute or chronic phlegmasia as well as sarcoma, which has a more rapid course. Moreover, the tumor was fluctuating and the general condition satisfactory. Exploratory puncture removed all doubts, yielding a lemon-colored fluid, so that the diagnosis of cystic tumor was rendered. Treatment consisted in enucleation under local anesthesia (novocain-adrenalin). In the course of the intervention, the cyst-sac was ruptured and a large amount of yellowish fluid escaped. After careful scraping, the bony gap was painted with carbolic acid and packed, tight tampons being left in place during forty-eight hours, to guard against secondary hemorrhage, which occurred in a similar case under the authors' observation, where the packing was omitted. The histologic examination entirely confirmed the clinical diagnosis. The case seemed worthy of reporting, as paradental cysts in children are very uncommon, and especially rare in the lower jaw.

Gas-oxygen Anesthesia in Relation to Major Dental Surgery. E. I. McKesson, Ohio State Dental Association, November 30th, 1920.

The conclusions arrived at by the author concerning anesthesia in dentistry are as follows: (1) Gas-oxygen anesthesia is applicable to all operations for any patient. (2) Deep anesthesia may be obtained by secondary saturation,

which more completely fills the blood and tissues than was heretofore thought possible. (3) Secondary saturation consists of procedures, *first*, displacing as much of the oxygen and nitrogen as possible with nitrous oxide, resulting in spasticity and, *second* following this immediately by enough oxygen only to restore normal anesthesia with flaccid muscles. (4) The true signs of anesthesia are muscular phenomena.

For several years the author has resorted to secondary saturation in the management of obstreperous patients, and he has found none which could not be anesthetized with gas-oxygen. Every patient may be anesthetized whether he is an alcoholic, morphine habitué, or an athlete, but the difficult cases require greater nitrous saturation and it takes a minute or two more time to induce narcosis. However, after anesthesia is established it may be continued indefinitely, permitting the surgeon all the time he requires for impacted third molars, alveolectomy, and other prolonged operations.

Oral Sepsis and Its Radiographic Diagnosis. T. H. Woodroffe. Archives of Radiology and Electrotherapy, 1920, No. 245, p. 217.

A series of dental radiograms is now regarded as an indispensable preliminary to treatment, by a large number of dentists and physicians, when faced by a case of suspected oral sepsis. As a rule, septic infection about the teeth occurs in one of two ways: Either it is a lesion which has commenced in the periapical regions of the tooth, due to infection following death of the pulp, or the lesion has started at the gingival margin and is independent of pulp vitality. In those cases where the gum margin has been the first to be affected, pyorrhea alveolaris results. In the earliest stages, the soft tissues of the gum are alone involved, but before long infection spreads to the periodontal membrane, along which it progresses towards the apex of the tooth. The bone surrounding the tooth becomes infected, and is gradually destroyed from alveolar margin to apex, until finally the tooth may have lost all its bony support. As regards the radiographic appearances caused by pyorrhea, no signs of disease are visible in the first stage, where only soft tissues are involved, although occasionally the unhealthly state of the gingival margin may be indicated by concretions of tartar. The spread of the disease to the periodontal membrane, which very shortly occurs, will be indicated by a thickening of the light periodontal line. From this it is a very short step to involvement of the interdental bone, and in the radiographic print this is shown by the absence of the apices of the interdental spines. The further course of the disease is shown radiographically by progressive absorption of bone extending upwards from the alveolar margin towards the apex, until finally the teeth appear to have little or no bony support. Pyorrhea alveolaris is most commonly seen in connection with the incisor and canine teeth, but a similar condition is often present in connection with the molars and premolars, most frequently under overhanging crowns, projecting fillings, etc. Such cases as these are frequently overlooked. There is no doubt that the only method by which the dentist or physician can positively exclude the possibility of oral toxemia is by radiographic examination of the teeth.

The appearances are distinctive and in the case of periapical disease, the various stages of infection can be distinguished as follows: In the first stage of chronic periapical disease there appears a slight thickening of the light periodontal line, normally to be seen between the apex of the tooth itself and the surrounding bone. This is spoken of as a local periodontitis. At a later stage the bone surrounding the tooth becomes encroached upon, and its rarefaction and replacement by granulation tissue is shown as a more or less light area in the region of the apex of the tooth. An increase of this light area, with a diminution of the detail of bony structure visible, indicates the existence of a granuloma. In cases of rarefying osteitis with suppuration, a white or nearly white area is seen in the print, into which area the root of the affected tooth projects, the latter being frequently roughened and irregular. With suppuration, the margins of the light area are usually irregular and ill-defined, but if the granuloma has undergone a cystic degeneration, as sometimes occurs, the margins of the light area will be seen to be more sharply outlined, and traces of the wall of the cyst may be made out.

Radiographic examination may also reveal the existence of impacted teeth which are apt to have a very unfavorable effect on the general health, a cure of numerous reflex disorders due to impaction resulting from the extraction of misplaced molars. Recourse to radiographic evidence as to the condition of the teeth should be had in all cases of anemia, digestive disorder, iritis, intractable furunculosis, nervous disorders of obscure origin, in fact in all cases which experience has shown to be related to oral sepsis and mouth infections, now known to be responsible for a large proportion of serious constitutional disorders.

The Place of Radiography in Dental Practice. H. Round, Hettinger's Dental News, 1921, iv, No. 1, p. 6. (British Dental Journal).

Radiography in orthodontics can prove of distinct help through localizing the original position of the teeth before treatment is commenced, and as progress is made, watching the position of the roots during movement and the amount of disturbance of the surrounding tissues. The pictures provide the necessary guidance for the regulation of the moving force. Radiography is also extremely useful for the localization of unerupted teeth. Just as the radiograph has given great surprises in bridge work, so it may even be found, if similar and thorough investigation be made in the field of orthodontics, especially where much time has been spent in moving practically all the teeth in the mouth, that such teeth after so great an amount of disturbance never recover their normal relationship to surrounding tissues, and that the loss of so vital a relationship may eventually lead to serious trouble. In jaw surgery, radiography serves to determine the amount of bone to be removed, to watch the progress after bone-grafting, to localize sequestra, etc. In diseases of the jaws, tumors, fractures, or other injuries, radiography is of value, and the same is true for antral investigation. In cases of pyorrhea, good radiograms are helpful in determining the amount of alveolar destruction and the condition of roots. If crown and bridge work is contemplated, all roots to

be crowned or used as supports should be x-rayed. Radiography is also valuable for the localization of buried roots, unerupted teeth, and especially helpful in extraction of all wisdom teeth. Although it is not necessary, or at all desirable for the dentist to become an expert in all branches of radiography, it is comparatively easy for him to take films, which are of enormous assistance to him in his daily practice. It is only within recent years that the help of radiography has been utilized to any appreciable extent for service in dental work, but the radiograph does not yet receive the respect or the attention it deserves.

Roentgen Therapy in Dentistry. E. Knoche. Zahnärztliche Rundschau, 1920, xxix, No. 38, p. 445.

In the treatment of periapical processes through x-ray radiation, a preliminary condition for a successful outcome is the removal of the cause which has led to the formation of granulations. Accordingly, a careful treatment of the roots must precede the radiation, and before or after it, the roots must be unobjectionably filled, for the avoidance of reinfection, in all those cases where a gangrenous pulp has caused the process. When a foreign body, for example a nerve-needle pushed through the foramen, or a fractured root-segment, is responsible, its removal is naturally indicated. Calcium concretions deposited on the root likewise act as foreign bodies. Marginal inflammations, including so-called pyorrhea alveolaris, are not adapted to x-ray treatment, in the author's opinion, as they will heal of their own accord on removal of the cause. An exception is represented by the saccular form of pyorrhea extending deeply along individual teeth, where the loose granulations cannot be removed with instruments unless the mucosa is incised and turned back. This surgical procedure is usually indicated for the removal of the incrustations. In the single case in which the author tried x-ray therapeutic measures, bloody intervention was finally required. As a result of radiation, especially in cases which have recently passed through the suppurative stage, a considerable increase of secretion usually follows. Such recent cases therefore react at first by increased inflammation and pain, unless the usually purulent secretion is drained through a fistula. This naturally applies even more to the suppurative stage itself. Under the influence of radiation, a roentgenographically demonstrable new formation of bone occurs by way of the margin of the focus, leading in a few months, according to the extend of the disintegration, to complete interspersing with new bone. At first the control films still show a somewhat less dense spongiosa in the domain of the old focus, but it gradually adjusts itself entirely to its surroundings. The clinical course is such that existing fistulas close at the end of about a fortnight, after a temporarily increased secretion. Periosteal swellings subside when present, and enlarged regional lymph glands disappear even when not directly exposed to the rays. The subjective manifestations, in the form of tenderness on pressure for percussion, etc., disappear after about three weeks. When the rays have to be passed through the external skin, an associated phenomena is sometimes observed in the form of transitory epilation (loss of hair); pigmentation was also noted in one instance, disappearing without a trace after

six weeks. The radiation should therefore be applied as directly as possible to the alveolar process, and when the topographical relations do not permit a protection of the epidermis, the patient should be prepared as to the possible sequelæ. In the author's experience, the majority when asked to choose between radiation and operation, invariably prefer the former. No permanent damage of any kind was noted, and is not to be anticipated under appropriate technic. Children were excluded from radiation-therapy, in view of the extremely sensitive juvenile epidermis.

The radiation must unconditionally be applied by a trained x-ray therapeutist. Dentists lack the necessary experience with this highly differentiated agent, so as to exclude damage and ensure success. Moreover, even the larger instrumental equipments, such as are utilized for dental diagnostic purposes, are not sufficient for therapeutic measures. The roentgenologist is responsible for giving the right kind and amount of rays, for taking the proper precautionary measures, and for directing the entire session. He will also instruct the dentist as to the benefit to be obtained from the general radiotherapeutic view-point. The dentist on the other hand has to render the indications and estimate the success of the treatment.

In case a bloody intervention is to be performed in radiated tissues before the end of about two months, for example, an exploratory incision, scrupulous hemostasis must be attended to, for secondary hemorrhages are not uncommon, due to the irritative action of the Roentgen rays. In a general way, it may be said that the domain of x-ray therapy in dentistry is represented at present by the periapical sequelæ of the pulp, in the granulating stage, with or without fistula-formation. As compared with bloody treatment, it offers here all the advantages of conservative procedures, and as compared with purely medical treatment, it means a considerable diminution in the number of necessary sessions. As regards reliability, it can compete with surgical measures, and is superior to medical treatment. In the presence of the external preliminary requirements, and in cases which oppose technical or other difficulties to surgical measures, x-ray radiation will probably become the method of choice.

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EDITORIALS

The American Year Book of Anesthesia and Analgesia 1917-1918*

THE appearance of Volume II of the year book for 1917 and 1918 was delayed by conditions following the World War. This book is a collection of data on anesthesia extending over the two years mentioned. It includes a review of the various papers and clinics presented on the subject. The work has been arranged to cover various topics. Complicating Factors of Anesthesia are represented by seven articles covering 25 pages of text. Following this is Safety Factors in Anesthesia, and we find there an article by Byron R. East, D.D.S., of Detroit, on Oral Hygiene in Relation to Anesthesia, Analgesia and the Anesthetist.

Blood Changes and Circulatory Disturbances is the next topic, under which is a paper dealing with Blood Changes under Nitrous Oxid-Oxygen, by Theo-

**The American Year Book of Anesthesia and Analgesia,* 1917-1918. Edited by F. H. McMechan, A.M., M.D., Surgery Publishing Co., New York City.

dore D. Casto, D.D.S, Philadelphia. The dental profession is again represented in a chapter on Experimental Researches and Clinical Observation on Warming Nitrous Oxid-Oxygen for Anesthesia, by Dr. Paul Cassidy, of Cincinnati.

Under the heading of Pharmaco-physio-pathology of General Anesthetics are five articles, one of which is written by Dr. George W. Crile on the Research into the Nature of Nitrous Oxide and Ether Anesthesia, and one by Dr. Cotton on the Cotton Process of Ether Analgesia. Six papers are reviewed dealing with special methods of administering anesthesia, one of which is on the Nasal Administration of Nitrous Oxid-Oxygen Anesthesia under Low Pressure, by M. Ecker, D.D.S., New York.

Anesthesia at the Front and Anesthesia in War Surgery is covered by nineteen writers, eleven of which are from the Allies.

Local anesthesia is given much space which is divided into the Pharmaco-physio-pathology of Local Anesthetics, Local Anesthesia in General Surgery, Local Anesthesia in the Specialties, and Local Anesthesia in Dental and Oral Surgery. Dentistry and Oral Surgery is featured by being the one specialty given a special topic.

The book contains an index covering the current literature on anesthesia for 1917 and 1918.

We can conceive of no book that would be more valuable or contain more information relative to modern methods and use of anesthetics than the year book of 1917 and 1918. It is to be hoped that the next volumes will make their appearance at an early date so that the information contained therein will be available to the professions.

ORTHODONTIC NEWS AND NOTES

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

Preliminary Program of the Section of Orthodontia and Periodontia of the National Dental Association, Milwaukee, Wisconsin, Aug. 16, 17, 18 and 19, 1921

Officers of the Section

Paul R. Stillman, Chairman, ...53 Vanderbilt Ave., New York, N. Y.
W. C. Fisher, Vice Chairman,.....501 Fifth Ave., New York, N. Y.
John Oppie McCall, Secretary, ...360 Linwood Ave., Buffalo, N. Y.

Tuesday Afternoon, Aug. 16, 2 p. m.

Chairman's Address.
Paul R. Stillman, New York, N. Y.
Dento-Facial Deformities.
By B. E. Lischer, St. Louis, Mo.
A Further Study in Compensatory Treatment for Missing Teeth.
By B. Frank Gray, San Francisco, Cal.
A General Purpose of Orthodontia Appliance.
By W. J. Brady, Kansas City, Mo.

Wednesday Morning, 9 a.m.

The Making of Diagnosis and Prognosis of Peridental Lesions.
By Elmer S. Best, Minneapolis, Minn.
Some of the Essentials in the Treatment and Subsequent Care of the Investing Structures of the Teeth Beyond the Preventive Stage.
By Elbert J. Weaver, Milwaukee, Wis.
Subject to be Announced Later.
By F. A. Bricker, Rochester, Minn.

Wednesday Afternoon, 2 p. m.

The Field of the Removable Appliances and the Blending of the Removable and Fixed Principles.
By Victor Hugo Jackson, New York, N. Y.
Child Psychology in Orthodontia Practice.
By Geo. F. Burke, Detroit, Mich.
A Treatment of Some Extreme Cases of Malocclusion and Dento-Facial Deformities after the Developmental Period.
By A. C. Rhode, Milwaukee, Wis.

Thursday Morning, 9 a. m.

The Surgical Treatment of Periodontal Lesions.
By Justin D. Towner, Memphis, Tenn.
Periodontal Response to Irritation.
By Newton D. Thomas, Oak Park, Ill.
The Use of Monson's Instrument in the Correction of Traumatic Occlusion.
By Tom Smith, Langdon, N. D.

The Pacific Coast Society of Orthodontists

The meeting of the Pacific Coast Society of Orthodontists, in February, 1921, in Portland, Oregon, was one of the most interesting meetings the Society has ever held, the interest being sustained throughout all the three days' sessions. Dr. Charles C. Mann, of Seattle, was elected president for the ensuing year, while Dr. C. O. Engstrom, of Sacramento, was reelected secretary-treasurer.

Plans are being formulated for the 1922 meeting, which will be held in California, and it is believed a program of great interest will be offered.